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ANNIVERSARY ISSUE



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The National Horticultural Magazine

The National Horticultural Magazine is a quarterly journal, being the official publication of The American Horticultural Society, Incorporated. It is devoted to the dissemination of knowledge in the science and art of growing ornamental plants, fruits, vegetables, and related subjects. The Journal is published by Monumental Printing Company at Thirty-second Street and Elm Avenue in Baltimore, Maryland, and is entered as second class matter in the post office of that city in accordance with the Act of August 24, 1912. Additional entry for Washington, D. C., was authorized July 15, 1955, in accordance with the provisions of Section 132.122, Postal Manual. Subscription to the Journal is included in membership, which is \$5.00 a calendar year.

Original papers increasing the historical, varietal, and cultural knowledges of plant materials of economic and aesthetic importance are most welcomed and will be published as promptly as possible. Material of lasting interest appearing in related journals will be reprinted as available. Publications received for the Library will be reviewed and made available to members after publication of the reviews. These books are designated "Library" following the prices in the book reviews. Reviews of private collections will also be accepted and published. These books, however, are not available for loan to members of the Society.

Manuscripts should be prepared to conform to the style adopted in the latest number of the current volume. The nomenclature used in manuscripts, whether treating horticultural or botanical subjects, should be in conformance insofar as possible with the Codes published by the International Association for Plant Taxonomy. They should be typewritten with double-spacing, leaving a one-inch margin at the left for editorial direction to the printer. Footnotes to text statements should be avoided unless they are absolutely necessary. Usually the information can be included in the text, parenthetically if necessary, without making the reading too cumbersome. Footnotes to tables are often necessary and should be designated by small Roman letters. Literature citations, footnotes and illustration legends should be on a separate sheet. Authors are requested to give for each citation, the author, or authors, year of publication, full title or citation without abbreviation of the journal or volume, in the case of journals, the beginning and ending pages; of books the edition number and the number of pages, the name and address of the publisher.

One set of the galley proofs will be sent to the author for corrections, which should be held to a minimum, and such corrections should be returned immediately.

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The Journal is issued for the months of January, April, July, and October. Manuscripts must reach the Editorial Office at the Society's Headquarters three months before publication is desired.

Missing numbers will be replaced without charge provided claim is received in the Editorial Office within thirty days after publication date.

PAGES FROM YESTERDAY

It has been recorded that a Major S. H. Nowlin of Little Rock, Arkansas, was sent to the American Pomological Society's biennial meeting in Rochester, New York, in the fall of 1879. He represented the Arkansas State Horticultural Society. There were a few other delegates in the body from the Western States.

Major Nowlin, in reporting later to his Society, said that there existed a very wide difference of opinion between Eastern and Western men as to the value of certain varieties of fruits exhibited; some being adapted to and taking high rank in the West, were discarded in the East, and vice versa. He reported also that it was apparent that there was a wide difference in the mode of culture and general management of orchards and vineyards in the respective localities and climates. While taking these into consideration, and the almost inaccessibility of the meetings of the American Pomological Society to the majority of the Western men, it occurred to him to wonder why the "vigorous, active, wide-awake" men of the West did not strike out from their old mother, and, with their energy, zeal, and independence, establish for themselves a head to their own horticultural empire in the Mississippi Valley.

The Missouri State Horticultural Society met December 20, 1879, and formed a committee of nine—three each from Arkansas, Missouri, and Illinois, with power to carry out such an organization. This committee

was successful. The Mississippi Valley Horticultural Society was formed and held its first annual meeting in St. Louis, September, 1880.

By the time of its sixth annual meeting, held in New Orleans, January, 1885, the Mississippi Valley Horticultural Society had witnessed a steady and substantial growth and the members felt that they should have an all inclusive name for the Society. George W. Campbell, Secretary of the Ohio State Horticultural Society, Delaware, Ohio, motioned that the name be changed to the *American Horticultural Society*. This met with instantaneous approval from all present at the meeting except one. After the usual rounds of discussion, he was apparently pleased for the motion carried unanimously, and the American Horticultural Society came into being right then and there.

It is evident that this American Horticultural Society prospered during 1886, 1887, and 1888. Our library, however, holds nothing after the publication of the Fifth Volume of the *Transactions* for the year 1888. A full and complete history will be published in the years to come and we hope to have discovered the missing link by that time.

Today, upon the completion of the Thirty-fourth Volume of *The National Horticultural Magazine*, we wished only to take a quick glimpse into the past and to pay partial tribute to the men and women who are or have been connected with the *present* American Horticultural Society, which has as its founders what might be considered the horticulturally interested "aristocracy" of the United States Department of Agriculture. It was started in Washington, D. C., in September, 1922, with the original fond hope that it might be an American counterpart of the Royal Horticultural Society of Great Britain. Its scope was to be large enough to interest members of smaller specialty societies and garden clubs with material that would open up new horizons of plant culture. A National Horticultural Society was incorporated in Henning, Minnesota, in the same year on July 1. From the very first, efforts were made to unite these two organizations. Committees were appointed by both organizations to further this purpose and on March 23, 1926, the National Horticultural Society ratified the proposal of

both committees; the American Horticultural Society followed with its ratification on June 15, 1926.

Both these Societies had published bulletins of sorts, but in most cases these had been of local interest. The first bulletin published by the present American Horticultural Society was of great horticultural interest, had as its author Frederick V. Coville, and bore the impressive title of *The Use of Aluminum Sulfate in the Culture of Ericaceous Plants*.

At the time of the merger, the Constitution stated that "the Society shall continue the publication of *The National Horticultural Magazine* founded by the National Horticultural Society." The linoleum block covers, so familiar to the majority of members of today, started with Volume 6 in 1927 and were printed from the work of the expert hands of the Editor. One of the first used in 1927 serves as our frontispiece for this Anniversary Issue.

The contents of *The National Horticultural Magazine* throughout the years have been chosen to present material that would be of permanent use to the members and also of a type that would not likely be found in the popular magazines or other American plant journals. Our Editor since 1927, Benjamin Y. Morrison, has maintained the consistently high level of the published material. In doing this he has tried to present articles that would cover the many phases of horticulture interesting to members in the different parts of the United States.

During its early years the Society presented local lectures which were open to the public. These have been continued and are a valuable local service to the Society. Following these lectures the material was quite often presented in a later edition of the magazine. In addition, an annual spring flower show was presented for a number of seasons in Washington.

One of the important functions of the Society has been the publication of several very useful yearbooks. The first of these, *The Daffodil Yearbook*, appeared in 1935 and was succeeded in more recent years by five

further yearbooks. In 1939, 1940, and 1942, the Society published *The Lily Yearbook* which, as well as those on daffodils, furnished valuable information to the membership. In the war years the Society was able to lend assistance to the Royal Horticultural Society in publishing a volume of its daffodil yearbook. Both series of these yearbooks are now temporarily discontinued.

More recently an attempt has been made to publish useful information in the form of handbooks. The first of these, *The Azalea Handbook*, is in its Third Printing. Last year a handbook on *Vegetative Propagation* was published and is still being excellently received. *The Tree Peonies* were treated in the handbook series this year. The present thought is to devote at least one copy of the magazine each year to some special project of this sort.

The Society maintains a well catalogued library at its headquarters in Washington. This contains a large number of books dealing with horticultural subjects, as well as current and back numbers of many scientific and popular journals in this field.

The hope for the future is that the American Horticultural Society will continue to expand its function of providing valuable information and assistance to its members in the many branches of horticulture.

As a mere sampling of the material published in the completed Thirty-four volumes of *The National Horticultural Magazine*, a committee was appointed by the President to select some of the articles that might interest you. At the first sitting of the committee, enough material was chosen to fill three issues the size of the present magazine. More meetings were necessary to reach the final selections presented herein. The date of the original publication, which is necessary in many cases to understand the context, is given at the conclusion of each article.

FREDERICK W. COE, M.D.
Chairman, Anniversary Issue

The Joy of Growing Plants

L. H. BAILEY

The shadows of life grow long. They stretch back over eventful and confusing years. Great wars have been fought, the difficult discussions of peace spread their alarms, old friends have died, new names have come on the stage of life, accustomed ideas have vanished, and new subjects engage the people. Yet my plants remain, full of vigor, bright in their colors, bringing memories and mementoes of other lands; and they are silent.

These plants are desired for the joy and the surprise of growing them. The wonder of it grows with the years—how an inert item called a seed can spring into life and from it come an aspiring organism true exactly to its own kind and relationship even though planted half way around the world from the place of its origin and in soils and climates wholly strange to it. This is a perpetual miracle, none the less amazing because we are now so inquisitive about it with microscope and retort.

There are other incentives. It appears to be my part to try to understand the original species from which these plants come, so that we may know relationships and keep the records straight. I try to grow the novelties for this purpose; and to this end good herbarium specimens of all of them are made and permanently preserved, for reference and study.

My garden is small in the midst of a city, yet I have grown as many as eight hundred different things in it in a single year. I like to grow all kinds of a group or genus, and then devote the area to another group for a year or two or three, the former items having been discarded. The garden is in perpetual change and is never orderly and showy. In this way I have grown all the tribes of pinks, of campanulas, of aquilegias, armerias, aconites, and others. This year I have had several outside fields devoted to pumpkins and squashes and gourds, some of them in Florida, Louisiana and southern California. For many years I have thought myself informed on the species of these plants; but now as I grow them from Mexico and Bolivia and Argentina and otherwheres I am convinced that we are far short of understanding them as to their species.

All this work, with herbarium specimens, photographs, seeds, notes is botanical, and may be uninteresting to the horticulturist, and of course it cannot be popular in nature; yet the plants I work with are in great part horticultural, and I consider myself still a horticulturist as well as botanist. I do not now grow plants for display or for exhibition or for competition or for publication in the gardening journals; my fascination lies in other lines, and I publish my conclusions as technical contributions.

One of my satisfactions is what I call a box-garden. It is a crude affair on a slope to the south, of four runs or rows between boards on edge and cross-pieces, making sixty compartments or boxes about 12 to 15 inches. A roof or screen of wire mesh is put over it in summer, to protect from dashing rains and scorching suns and early autumn frosts. These boxes are always full of something or other; this year half the boxes have grown things of which seeds were sent from South Africa; I do not yet know what all of them are. It is now early October, and already seeds from here and there are dropping into containers to be planted in the box-garden or elsewhere next spring, and no questions asked.

As example of the scant knowledge of the natural species involved in origin of horticultural varieties I cite the case of the brambles. Here are all the cultivated raspberries, dewberries, blackberries. I have grown many of them. Most of the blackberries are known to be from stocks native in this country. For many years I have been making collections of herbarium material in this genus *Rubus*, and at present have more than 27,000 mounted sheets of

them; effort has been persistent to make specimens that really and truthfully represent a blackberry bush or a dewberry vine. For the past five years I have given special attention to a monography of North American *Rubus*, and the last fascicle of the publication is now on the press. Heretofore we have recognized about 80 species of *Rubus* in North America, but now I have described about 400 species, new and old. Much breeding has been undertaken heretofore in *Rubus*, but the published results as to specific parentages will now be of little avail. Perhaps future breeding may have a somewhat accurate basis. Of course some of the horticulturists and botanists will not accept the new species I have described, but that will make no difference with the facts in nature. Some writers undoubtedly will reduce the number, making some of them synonyms or duplicates of others, which may be easier than trying to understand them; but the practices in crossing and breeding must in any case take a new turn.

One of the outstanding satisfactions in the growing of plants is to know what you have. Every one of the main groups of cultivated plants undoubtedly abounds in errors. Somebody must attempt to straighten out the nomenclature and relationships; this requires slow and patient study. It defines the bases of horticultural work.

The joy of growing a plant lies in the mind. Therefore we understand why every person finds satisfaction for himself or herself, in any neighborhood or climate. It should be part of public education to stimulate the desire to grow plants. Satisfactions are in the nature of the case.

(January 1946)

The Gentle Art of Weeding

ALFRED BATE

In his essay on Gardens, Bacon observed that in the evolution of the arts man begins to make beautiful gardens only after he had erected stately buildings, "as if gardening were the greater perfection." Bacon was writing of the planning of gardens and of the finished composition, not of the upkeep or tendance. In those days of almost costless labor, no gentleman or lady would have thought of touching the soil. "Dirt gardeners" are one of the very few sane developments of recent years.

As "dirt gardeners" we know a great deal about digging and preparing the soil before planting, about setting out the plants and tending them while they are establishing themselves, about seed sowing, hybridizing, spraying and fertilizing, but surprisingly little about the art or skill of weeding. At least this is my conclusion from observation over a period of many years made in gardens tended by otherwise excellent "dirt gardeners," who either do all the work themselves or have a part time helper.

All other phases of gardening we all do gladly and thoroughly but this latter skill we shirk or carefully perform so that Bacon, if he were writing today, might speak of weeding as the last acquired skill and therefore "the greater perfection."

That no garden looks better than after a thoroughly well done weeding is a boring platitude. In these days of high-cost labor, we cannot always disguise the fact that our plants grow on earth by completely hiding the ground with annuals; and for my part I would not desire to do so. Well tilled soil is a joy in itself and brings into relief the vegetation on it. Yet, how often is the weeding done carelessly — plants broken, stems of tough weeds merely severed at soil level, small piles of wilting weeds left to be collected later, soil uneven and lumpy. Slovenly gardeners, you will say; I differ with you for I know several very meticulous gardeners who in the press of time have no qualms about leaving a weeding job in this condition when they would never think of walking away from a transplanting, a seed sowing, a pruning job. I also know several who habitually pull up large weeds, dropping them near by to be collected "tomorrow" and leaving the hole to be filled in by the rain; but would never think of not leveling the soil after planting bulbs.

So much for my accusations except that I would like to point out that we approach the weeding problem from the wrong angle: we dread it, think of

it as a necessary hardship. It is not; it is an art, a skill, a relaxation. I have come to this conclusion, though I, too, once considered it a drudgery, by taking upon myself the weeding job when visiting my gardening friends and finding it a very pleasant way to relax in the sun and at the same time accomplish something toward the garden's well being. And because my friends express amazed appreciation at the results both in appearance and thoroughness, I have concluded that an article on weeding might help to change gardeners' attitude and give hints to change their methods of work.

Every craft has its tools. The first one in this skill is a rubber kneeling pad, for one is going to spend several hours on his knees and the ground may be wet and certainly is hard. There are few who, like our editor, can crouch on their haunches for hours while weeding or transplanting and fewer still who can stand and bend over to attack the weeds. I might here observe that one necessarily kneels which is a posture of reverence and that the medieval monks had a maxim, in these days it would probably be called a slogan, that "to work is to pray." Well it is. And I will go a bit further to say that in this kneeling posture of weeding one can meditate on many things; how well, depends upon yourself — and what you are interested in. And I wish to observe here that if you think about what a nasty job you have to do you will not get any good out of your kneeling — nor do a good or beautiful job of your weeding.

The second tool is a basket, large or small, for the weeds; never leave them on the ground, both for neatness and because often seeds ripen on extracted weeds with surprising rapidity. If you use a small basket, a strawberry box type, have a large one on the lawn or the path into which the smaller one may be emptied from time to time; and

the large one should be taken to the compost pile every time it is full, not heaped for then there is danger of scattering weeds along the path.

The third tool is a wire-pronged cook's fork—which will never be found in the tool department of a seed store. Years ago as a child, I saw the grocer spear pickles from his pickle barrel with one and demanded it. My mother appeased me by promising to get me one; I demanded two. "Why two?" "One to dig up seedlings, the other to bend the tines like a little rake to grub with." I have never been without several, bent to all sorts of shapes, and find them the most valued of tools. Bring the long tines closer together and one can easily and safely extract the smallest of seedlings, bulbs and weeds when they are close beside plants. Left as it is, it is a perfect weed extractor for deep-rooted and tough ones. With tines bent at right angle at about half an inch from the points, it is a perfect grubbing tool and one with bent tines brought close together is ideal for grubbing between small closely-planted things. In these days, one has to search for them among kitchen gadgets, one may find pressed steel flat-pronged ones which should be avoided as they break easily. Country stores still have them and recently Woolworth has had them with gaily-colored handles. They are well worth seeking out and treasuring when found.

The fourth tool is a narrow trowel; but with the cook's fork in your kit it is not absolutely necessary though it is very useful to dig out dandelion, plantain, dock and kindred deep-rooted evils.

The fifth tool is a child's rake. Its light weight, short handle and narrow comb make it handy to smooth over the larger weeded areas and especially those beyond your arm's length which you have had to stretch to reach in weeding.

The sixth tool is necessary only where large areas of weeds and grass, where no plants or bulbs are growing, are to be cleared. It is an ordinary hand fork with strong prongs; its usefulness will be detailed later.

The seventh thing necessary is a clear healthy mental attitude and patience to do a thorough job, and joy in that you will not only be helping the plants to be more comfortable and are creating a more beautiful garden, but also in that you are helping to decrease the evils in the world.

As a skill, a craft, an art has its tools so, too, does it have rules of workmanship. After having tried out several methods of procedure, I am certain that the best way is to start from some fixed point and work forward, not backward. By this I mean to work with the unweeded part before you and thereby always seeing what is to be done, not what has been finished. Always place the weed basket upon the path, the lawn or the weeded area and never on the space to be cleared; it bends the weeds which makes them harder to extract. It seems hardly necessary to say that your tools should always be ahead of you where they may be readily seen when needed and no time wasted in looking for them. Yet you will be surprised at yourself to notice how many times you will forget to move them along with you as you work up the path. Often I have needed a tool which I have not used for a little while and have had to get up and walk down the path to retrieve it.

Whatever you are going to weed, there will almost always be a path or a lawn from which you can start operations; but not always will you have a free space to work it at first if there is a thick edging of low-growing plants along the path. In such cases I always start beyond the edging and, after having cleared an area of weeds, work back through the edging if there are weeds

in it. With a small cleared space of loosened soil beyond the edging, weeds growing just within the margins of it are easily extracted by pulling them toward the loose soil. Weeds in the center of the edging are more of a problem; if they do not come up easily, the kitchen fork, with tines drawn close together, can be used to loosen them with little or no disturbance of the edging plants.

An observation may be inserted here. I find that weeds which do not come up easily with a gentle pull may often be extracted by working them back and forth or with a circular movement while at the same time one gently pulls on them. I only use the kitchen fork, when weeds are close to plants, after all efforts have failed. I can not emphasize this advice too strongly: coax the weed roots out by the above method and do not try to extract them by a strong sudden pull for by so doing you will more often than not break the weed stem at soil level and then have to dig the roots out, always a waste of time and harmful to any bulbs beneath the soil. Another advice may be given here; always draw the weed toward you and the loose soil you have just been working in. There are several reasons for this. Drawing the weed toward you is easier and more comfortable in your kneeling position than pulling upward or away from you. Then, too, the loosened soil forms less resistance than solid earth and the ground will crumble away from the weed's roots as you draw it out on a slant. As you are facing the unweeded portions you can more readily see what you are doing, how close weeds are to the plants, what seedlings, which you may want to save, are growing among the weeds, what holes have been left by bulb stems which should at this time be thoroughly filled to prevent ants, bugs or slugs using them. When you expect to find seedlings, it is advisable to have a

strawberry box partly filled with soil handy so as to heel in the seedlings in it as you come across them and not expose their young roots to the air longer than necessary. It is a great annoyance to have to leave the weeding every few minutes to plant out seedlings which you may want to save. By having the strawberry box with you you can safely store them for the time and set them out later.

After the first cleared space has been made and the edging weeded as far up the path as you can easily reach, work across the bed or border as far as you can stretch. If there still remains an unweeded portion which cannot be reached from the back of bed or border (borders against a house or fence) and even by resting with one hand on a weeded area cannot be reached, the kneeling pad may be carefully placed between plants and knelt on with one's feet in the path and with shins bridging over the edging. (Skirts and even slacks are decidedly a hindrance at this time—play suits and shorts are far more desirable.) Only after weeds have been cleared from a strip all the way across the bed should one move up the path to the next section of operations.

When the kneeling position becomes tiring, and I can assure you that it will, I often sit on the pad with legs stretched out in front of me. This, of course, can only be done when working from a path or lawn. Then tools are handiest kept beside you on the other side from the area of work, while the small basket is kept between you and the space being weeded.

It is advisable to rake over each section before beginning to weed the next. This saves one the trouble of going over the entire work later and has the advantage of leaving each section finished should you be called away before the entire job has been done. It also assures you of ample protection and covering of any plant roots which may

have been exposed in your weeding.

Having outlined the technique which I have followed for a number of years and consider the best method, at least for me, there remain some phases which should be decided by each weeder for himself. First, there is the problem of handling pests. Under this head, I am not referring to spraying, which should be done when needed and is not a part of weeding, but to ants, slugs and grubs. If during your work you have uncovered ant hills and the inhabitants are so numerous that they interfere with your comfort, weed around the outskirts of their domain and bide your time. After sundown mix in a watering can a solution of Red Arrow in the proportion advised on the bottle and soak the ant-ridden area, being sure the solution runs down every channel. Time after time I have used this means of extermination and it has never failed me. When you expect to find slugs or snails it would be well to have a coffee can with salt in it into which they may be dropped as you come across them. Japanese beetle grubs may be given the same treatment if you are too squeamish to crush them between your fingers. And while on the subject of coffee cans, their usefulness may be extended to the collecting of slivers of glass or china which are often in the soil of new gardens.

Then there is the question as to the application of fertilizer. My preference is to apply bone meal or dried manure after the entire weeding job has been finished. My reason for not applying it section by section as the weeding proceeds is that too often I either leave a gap between areas or overlap them. Then, too, I like to sprinkle after applying fertilizer so that it will sink immediately into the soil.

And now as to weather. Dry, sunny days have the advantage that the weeds wilt quickly—but so does any plant which may have been disturbed at its

roots; then, too, the soil may be so dry that weeding is difficult. Damp, cloudy weather (unless the soil is sodden) has the advantage that weeds come out easily and root disturbance of plants is not serious, but it gives the weeds on the compost pile a longer lease of life in which to ripen their seeds—and rain may come to stop your work. Usually I have no choice in the matter—weekends being what they are; but had I, I would prefer sunny weather following a rainy day.

Much can be said under the heading of seasonal weeding. Were I at liberty to spend all my time in the garden, I would have four great seasonal weeding with small special efforts between as cases demanded. I am optimistic enough to feel certain that a garden could be practically freed of weeds should one attack them regularly and systematically over a period of several years. I say this with full knowledge that birds will always bring in poison ivy, brier, etc., and that dandelions are always blowing.

Let us start with the late autumnal clean up after all bulbs have been planted and transplanting finished. Why not combine a thorough weeding as outlined above with this clean up? It would be a gala (dare I use that word?) performance and might, according to weather, last for a couple of weeks; but it would be wholesome to be in the sun (when possible) and heartening to know you are doing good deeds. As one weeds then, the dead stalks of plants could be cut down to within six inches of the ground; if one feared for the hardiness of a plant, the twiggy portions of the stems could be left about the crowns after having worked the soil in around them. Chrysanthemums, Japanese anemones, phlox, etc., should at this time have plenty of soil worked into their crowns. But remember that too early a use of this application for protection may give homes for

field mice. At this time seemingly dead root clusters of stoloniferous grass can be taken out. It is *not* advisable to rake the beds and borders level if your garden has a tendency to be wet or undrained in winter or early spring. Far better would it be to rake slight gullies between hilled up plants, which gullies drain off surplus water to the front edge of bed or border where it can flow down path or lawn. During the winter chick-weed is likely to make every effort to annoy you and every opportunity should be taken to eradicate it; sorrel also often takes advantage of mild winter days.

Spring weeding is what I dislike most. If one does it early there is always the fear of disturbing the tender shoots of bulbs or plants; if it is done late there is the danger of breaking the lush bulb or plant foliage. But chick-weed, sorrel, grasses and a host of other evils are growing as rapidly as the garden plants and must be got rid of. It is always a slow and tedious labor. At this time the weeded ground should be raked level and all cracks in the soil made by the winter eliminated as well as the drainage gullies smoothed over. After this weeding is the time I most prefer to add fertilizer which then feeds both the flowering spring plants and those which will blossom through the summer. Whenever possible I prefer to do spring weeding the last of April or very early May.

For the third grand weeding spree, I prefer mid- to late June; then everything has reached full growth and the spring bulbs have retired to rest. But long before this I have gathered up the dry dead foliage of the plants that have made Spring pleasant and stirred soil into the channels which the stems have left, lest ant or slug find easy access to root, bulb or corm below. It seems hardly necessary to warn against removing this foliage before it is thoroughly ripe, yet I have seen good gar-

deners whose misguided sense of neatness drove them into pulling off half-ripened foliage or plaiting it and then hear them complain the next spring that their bulbs were not flowering well. At this weeding period certain plants may need to be staked, which operation is an art in itself and I shall not dictate. But I will suggest that now is a good time to pinch back chrysanthemums for the first or second time depending upon your climate and also upon their growth.

Mid- to late August would be the next weeding festival and in the hot summer sun there should be little to do but just weed. If the jobs of the past have been thoroughly done there will be fairly little to be done now except for seedlings—both weed and plant. Advice as to flower seedlings has been given above. Small seedlings of weeds will usually die under the hot sun if merely raked loose. Of course, if they are numerous, they must be gathered up; but remember, this is a lazy time so beware, for a rain may revive all the ungarnered weedlings and your half-done labor come to nought. Is there not a Scriptural text which reads "Be not weary of well doing?"

During the spring and June weeding, spaces where you may want to plant bulbs or to remove things should be marked while you know not only where the blank space is but how large it is. I have found it a good plan to have 6" wood labels at hand, thrusting them into each space after marking a number or name on them with wax pencil and also recording number or name with size of space in a notebook. The label is placed in the center of the space and when autumn comes and the bulbs are to be planted, there is no worry about cutting into bulbs already there.

The above suggestions all pertain to the weeding of bed and borders; what follows are suggestions regarding the clearing of ground which is to be taken

into cultivation and when it is not advisable to have it deeply enough trenched so as to bury all grass and weeds. And I may point out here that a mere spade's depth is not enough to kill out most weeds and grasses. In such cases I find it best to use a spading fork and to loosen the ground in strips across the area by digging the fork fairly deeply and then almost lifting out the sod. This usually loosens the roots enough for easy extraction and deeply-rooted things may be dug up with the trowel. But in heavy soils, especially when dry, one may have to turn the clod over and beat it with the back of the fork. I have started with the hardest type of area; when you are working on more open soil and more moist conditions, the hand fork mentioned under tools will do the work better than a spading fork which necessitates your getting up and down frequently. The technique, however, is the same whichever tool is used. And no matter how thoroughly you do this job, you may always count upon having to reweed later for seeds abound and weeds you do not find at first cleaning will mock you when once the area has been cleared.

A great many years ago an old doctor taught me the value of what he called his "plantain stick." An old broom handle is sharpened to a point at the end where the broom has been and a 2" block is nailed to the handle at about 3" from the point. The point is inserted into the ground next to the plantain for about 2" and the plantain pried or levered out by bearing down on the handle. In August when plantains are making next year's roots this is easily and quickly done. They are easily lifted out by using this device. One should always thrust the point into the earth just next to the weed's stem and see to it that the fulcrum (wood block) and your weight are in direct line with the stem of the weed.

(July 1950)

Roscoea

FRITZ LEMPERG

The very peculiar looking but extraordinarily beautiful herb, *Roscoea humeana*, belongs to the small, specifically tropical family of ginger plants, ZINGIBERACEAE, which are placed between the bananas and the cannas and so are fairly closely related to the orchids. Of this family only a few genera are useful in temperate regions and particularly *Cautleya lutea*, the *Hedychium gardnerianum* of gardens — a species which like canna is well adapted to garden purposes — ascending to 2200 m. in the Sikkim-Himalayas, and the species of *Roscoea* which in the Chinese Alps extend still further into cold climates and prove rather desirable for open-air cultivation in Central Europe.

The illustrated plants, whose flower

stalks about a span high overtop the somewhat longer, flexible, shining green leaves, flower in midsummer with flowers of a beautiful purple color playing somewhat to wine red. The helmet-shaped upperlips of the flowers have a diameter of 3–4 cm.; are also very conspicuous for the size of the plant and curve in a beautiful arc over the smaller petals and stamens. The seed capsule, as in crocus and colchicum, is buried deeply between the enfolding leaf sheaths. *R. humeana* is much more beautiful than the longer cultivated *R. purpurea*, whose smaller flowers are in poor relation to the abundant foliage.

From an entirely different location comes the indescribably tender yellow *Roscoea cautileoides*. Before the flowers appear, one might think it to be *Iris sibirica*. In its asymmetrical flower shape it is much more like a gladiolus,

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Forrest's Field Photograph of *Roscoea humeana*

Gartenschönheit



*Roscoe humeana*

Gartenschönheit

but in older plants a greater number of stalks about 40 cm. high spring up which at blooming time stand well above the foliage and bear 6-8 flowers arranged laterally. According to Handel-Mazzetti in his botanical exploration in Yunnan, I understand that this plant occurs as well in lilac and mixed colors. They are found there on limestone formation. In cultivation, *R. cauleoides* needs no more than a sunny position in heavy loam soil with under drainage of limestone rubble. *R. humeana purpurea*, and perhaps *R. sikkimensis* as well, belong, however,

in warm positions in the Alpine or rock garden in deeply-worked fertile soil, well mixed with leaf soil (an addition which, except for mountain plants in general, is not always to be recommended!), not too sunny, and develop there their extraordinary beauty; for they must be considered, from their occurrence in their native home as plants of the moist edges of mountain forests and underbrush, somewhat like our native ladyslippers. When one has secured in autumn the collected, not too-promising-looking roots—possibly from Van Tubergen, Haarlem—one



Gartenschönheit

Roscoeae cauleoides

should hold the plants over the first winter in pots in a cold frame. In spring plant them, without disturbing the balls of earth, at a proper depth in the permanent position where they can then develop happily. Concerning lime in the soil, they are indifferent. A covering of a little mound of dry sand and a few branches serves to protect them through winter hardships. All push up late and disappear after ripening the seed. *R. cauleoides* this year was particularly late, but developed very quickly and flowered well as the picture

shows. Like the others, *R. cauleoides* is easily and freely raised from seed. Such is available from Frickart, Stafa in Zurich, and Thompson & Morgan, Ipswich, England. The family was named after Roscoe, an English scholar, who in 1828 published the first monograph *The Scitamineae with a Fertile Stamen*, also the then known ZINGIBERACEAE and CANNACEAE. Experiments with these beautiful and not particularly difficult cultivated plants will reward earnest plant lovers greatly.

(Gartenschönheit, July, 1929.)

(April 1930)

Some Californian Flowering Shrubs

LESTER ROWNTREE



Romneya coulteri

Matilija Poppy

The wayfarer in the sequestered regions of California develops a strong affection for many of the less colorful shrubs of the chaparral, desert, mountains and coast. It is, however, the more brilliant flowering shrubs which arrest the attention of the newcomers, who are generally inspired to possess and grow them. Among these latter shrubs are the "big four," *Romneya coulteri*, *Dendromecon rigida*, *Fremonia californica* and *Carpenteria californica*, all quite worthy of the admiration which they evoke.

Of the four, *Romneya coulteri*, the Matilija Poppy, is the most impressive. Not only is it a gorgeous thing in the mass, as it ramps about in the canons and the small empty stream beds known as "dry washes," but it well repays closer inspection. In the bud the smooth gray-green sepals release crumpled swan-white petals which slowly unfold a fragrant seven-inch flower. Young blooms keep their crepelike quality but age erases the lovely wrinkles and before they fall the silky petals are paper-smooth. In the center of the flower the heavily massed stamens poise in a symmetrical golden ball.

One of the charms of the Matilija Poppy is the nice harmony between the flower and the foliage—large smooth divided blue-green leaves and gray-green stems. The plant is comely all the year round except in the late autumn, when, for its benefit as well as that of the grower, the stems should be cut to between six and twelve inches of the ground. The enforced cessation of activity conserves the plant's energies and strengthens its root growth—sometimes an unnecessary measure, since *Romneya coulteri* is a rampant

grower and if given the chance will claim a whole hillside, thriving in any loose, well-drained soil (but with an antipathy for heavy clay). Sun and aerated ground are its chief needs. Moisture and drought it treats with indifference, associating cheerfully with the flame-tongued *Fouquieria splendens* in the blistering heat and parched sand of the vast inhospitable desert, and equally at home in the shelter of gentle English gardens, where you find it thoroughly domesticated, trained fan-shape up the side of a house, or, refined and poised, making a background for plump, blue hydrangeas.

As the seed, fresh or stale, seems to be equally loath to germinate, even when fired, root cuttings, from November to March, make the quickest method of reproduction.

Romneya coulteri is hardy south of Washington, and as it will stand 10 degrees of frost can often be coaxed through a winter in the colder states.

Its botanical variety *trichocalyx* differs little from the type, seeming not much more than a different form with localized stands here and there in the southern part of the State. It has wider, grayer leaves, rounder and more hairy buds, blooms earlier, is lower growing and more floriferous and is possessed by a more vigorous determination to spread.

The uninitiated sometimes confuse that gigantic prickly annual, *Argemone platyceras*, with the Matilija Poppy. But the flowers of Prickly Poppy are smaller and the manner of growth entirely different.

Dendromecon rigida is a near relative of *Romneya* and is a boon companion of the heat- and sun-loving species of *Arctostaphylos* and *Ceanothus*. In its natural state, it blooms the year round but is a little untidy in the management of its seed pods. While young, these narrow, curved fingers

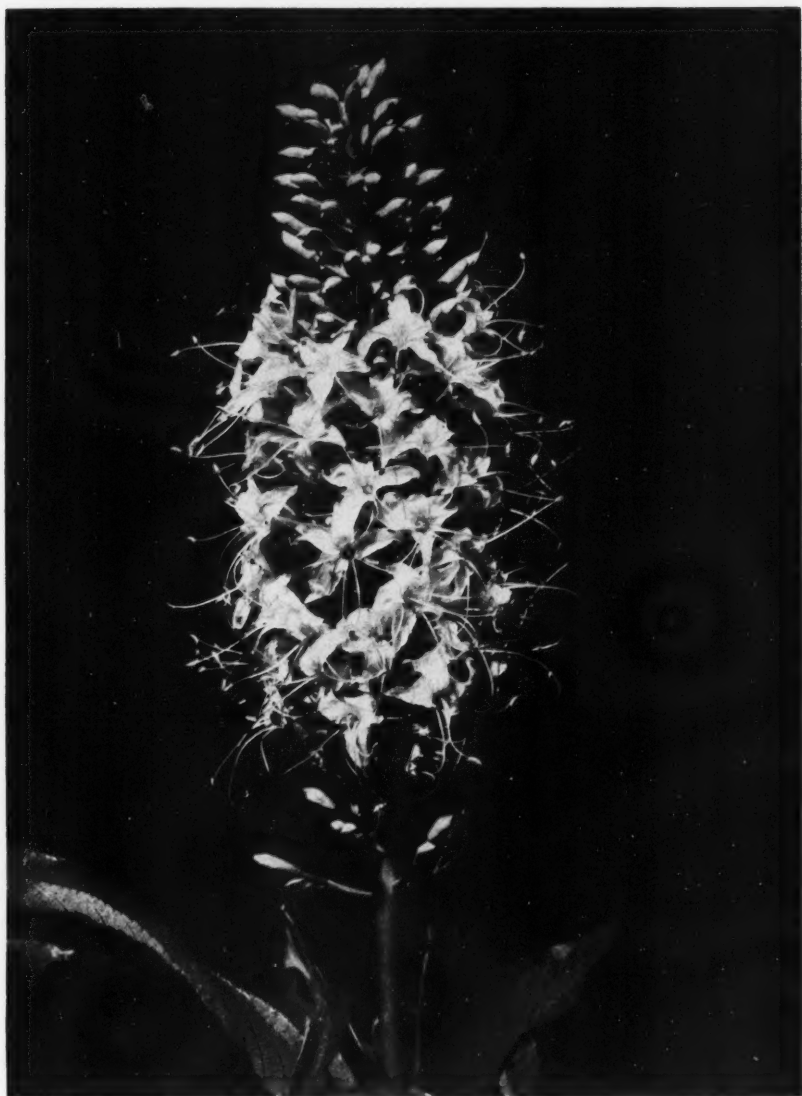


Fremontia californica var. *mexicana*

are not objectionable, but, after the little explosion which releases and discharges the seeds, the two shredded valves hang on, quite useless, for an unnecessary length of time. The

flower is a lovely thing, butter-cup yellow with a silken sheen; the pale green leaves are willow-shaped and stiff.

This Tree Poppy, like *Romneya*, has



Lewis Josselyn

Aesculus californica

so far withheld from us the secret of speedy seed germination. We do know that loose soil has something to do with it. For while in old remote stands not one seedling may be showing, in the

recently dumped soil of new road banks thousands of young will appear, with one accord making this newly disturbed earth a glorious tree-poppy garden. These seedlings make haste to bloom

and when their small stems are covered with golden buds suggest plants of the English globe flower (*Trollius*).

The large, satiny, deep golden hibiscus-like flowers of *Fremontia californica* cluster round the many long flexible branches of this splendid shrub (or small tree). The rough leathery, one-inch leaves are rich dark green above and downy underneath, not abundant but increasing when the plants are brought into cultivation. In California gardens, where its use is beginning, the first bloom often appears in January, but unless the rains are early and frequent the wild shrubs which occur singly or in large thicket-like stands on warm hillsides do not flower until May but will go on until July. It will stand about the same amount of frost as the Tree Poppy—not quite so much as *Romneya*. And if it is used as a garden plant, be sure not to overwater. At first the unusual amount of moisture incites the shrub to rank growth and for a year or so it speeds ahead. But before long the excess water will cut short its life and you will walk out one day to find your prized *Fremontia* a brown and dry derelict.

The variety *mexicana* is used in culture more than the type; the flowers are larger, more deeply colored and beautifully flushed with red-brown underneath; the leaves are more deeply cut, almost like small fig leaves.

Carpenteria californica fills the Californian heart with pride, for it is one of our choicest and rarest endemics. To not all of us is granted the sight of the native stands of *Carpenteria californica*. Happily the shrub is now dependably "in the trade." If you know *Cistus laurifolius* and have seen a good-sized bush laden with large white flowers, you have a good idea of what *Carpenteria californica* looks like, but the shrub is narrower, the white-faced leaves narrower and somewhat revolute, the large white flowers (borne

also in clusters) are centered with a mass of golden stamens. The bark is silvery gray, and shreddy on aged plants, the shrub long-lived and about as hardy as the other three we have described, which means not hardy in the coldest gardens but possible where the thermometer does not drop below ten degrees.

Carpenteria and *Fremontia* come readily from seed and *Carpenteria* in particular is a quick grower. It is native on the open banks of canons where the soil is of humus and shale, and like the rest is intolerant of poor drainage.

A close runner-up for this important four is *Styrax officinalis* var. *californica*, one species of a familiar genus of shrubs, many of which are in cultivation. It carries with it the curse of deciduousness, which for those gardeners with the evergreen complex puts our *Styrax* beyond the pale. It is a spring flower with a not very long period of bloom. When crowded up among other shrubs of the chaparral its beauty is lost, but when, as often occurs, one shrub escapes from the herd and gains foothold on some abrupt bank, its full beauty of form, leaf and flower is manifest. *Styrax occidentalis* var. *californica* is not far behind the other *styrax* species in grace.

The white, fragrant, bell-shaped pendulous flowers, about an inch long, drop from calyces of old gold and expand to show the inner wealth of golden anthers. Later they are followed by little tan nuts. If gently cracked, the nuts will germinate quickly but the seedling must be transplanted young, for it resents interference more and more as it grows.

Aesculus californica, the California buckeye, reminds you of the lovely horsechestnuts which make a background for eastern lawns, but ours is wider and looser growing. It is rather

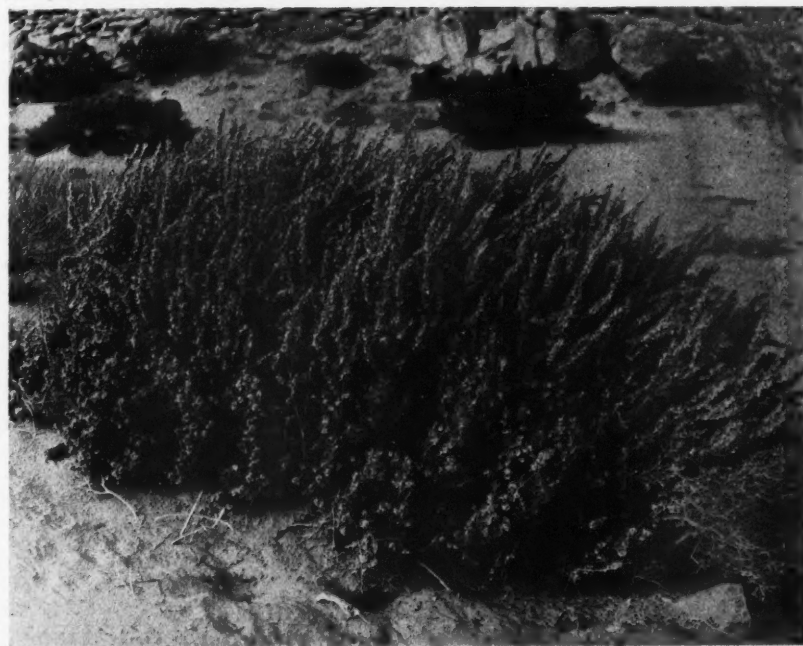


Lewis Josselyn

Castanopsis chrysophylla var. *minor*

Harry H. Haworth

Atriplex canescens





Isomeris arborea

more of a tree than a shrub, a very decorative, rather sprawling tree, deciduous, and showing as definite seasonal variations as does any flowering plant in this climate. The buckeye is a help to those of us who can never become accustomed to the lack of these natural demarcations. Almost subconsciously we note "The leaves are off the buckeye, so it must be winter," "The buckeye is blooming — spring is well under way." And when we see the big, glossy, mahogany-colored chestnuts thick among the dried palmate leaves under the tree, we know autumn is here.

The heavily-scented chestnutlike flowers of *Aesculus californica* are light colored when they first open in a pointed panicle — later the flowers

turn pink and yellow and the panicle broadens.

From the Sierras comes the Bush Chinquapin, *Castanopsis sempervirens*. Its very name brings to mind the huge granite boulders among which it wanders, crouching close to withstand the wind, mingling with *Quercus vaccinifolia* or forming little colonies at the edge of forests of Tamrac Pine and Red Fir. The dark green, azalea-like (though stiff) leaves are neatly veined and a beautiful golden green beneath. The terminal flower clusters have a sickly-sweet scent and are composed of upright catkins an inch long. The nut is shut into a prickly bur, closed in tightly at first, but at maturity lying cupped like an egg in a nest until seized by a squirrel or blown out by the wind.

Nicotiana
glauca



Often a bush will be blooming and fruiting at the same time. When brought into the garden it sulks, grows slowly, longs for the mountain tops and seems so utterly out of place that you suffer pangs of remorse at having taken it from those high slopes where snow covers it in winter and where the fierce light and strong wind of the summers are its springs of life.

The *Atriplex* is one of those genera

which seem to divide themselves equally between sea and desert. This habit is so frequent among the native flora of California that you are always trying to answer the questions: What common essential do these desert-ocean plants find? Why does one continually discover the same genera, often the same species, on hot, dry desert exposures, and along the coast? Is it the sand? Is it the glare of light? How

did they get into two such contradictory places and why aren't they growing in the space between? Even in cultivation, coast species often thrive in the desert and contrarywise.

Atriplex canescens is one of a vast genus having this marked preference for either the coastal stretches or for that sun-baked area east of the southern Coast Ranges. The desert happens to be its choice. It is a wide, brittle, rather round shrub of about four feet, covered with small, narrow, gray leaves and smelling like a painter's shop. The bark is a yellow tan and the young shoots red spotted with gray. It associates with creosote bush and the glorious *parosela* species. In late summer it takes on an unexpected splendor when it becomes heavily freighted with golden bracts in long dense panicles, leaning out and downward and smothering the bush in a cloud of glory.

Isomeris arborea is another inhabitant of the seashore and the arid wastes of southern California—a low shrub with the gray foliage characteristic of so many plants of the coast and desert. The yellow flowers in terminal racemes are showy with conspicuous protruding stamens. These are followed by large inflated and quite decorative seed-pods, which give the plant its common name of Bladderpod. The whole plant has a strong odor something like that of a vegetable soup composed largely of turnips. While I am properly impressed with its decorative qualities, Bladderpod is one of the few native plants for which I can feel little affection. Not because of its strong smell, which after all is its own affair and no worse than that of many another plant, but because to my critical eye it seems a bit coarse and a little

vulgar, both in flower and seed. However, it has acquired favor in gardens and has the good fortune that I seem to be alone in my prejudice.

Tree Tobacco, *Nicotiana glauca*, is not really a Californian at all, but a native of the Argentine, which long ago invaded the State and which has spread so rapidly that it is often thought an indigenous shrub. And ubiquitous as it is, it is so picturesque that it adds definite charm to the landscape—a tall slender shrub, loosely branched, with big, smooth, gray-green leaves and graceful terminal sprays of long, tubular, yellow flowers. The seed is borne profusely and is so fine that the wind scatters it easily. The dry stream beds and waste lands of southern California fairly bristle with little Tree Tobaccos. It would be used with good effect in landscaping work if it were not such a familiar object.

Beautiful as many of these conspicuous flowering shrubs may be, they have no firmer grasp on the affections of the wanderer in California's uninhabited places than have certain members of the chaparral on desert, seacoast and mountainside. These two imposing genera, *Arctostaphylos* and *Ceanothus*, have many lovable species; there is the spiraea-like *Adenostoma fasciculatum*, vibrant with the sweet chatter of wren-tits; the other *Adenostoma species*—*sparsifolium*—a stunning thing when seen against its natural background of boulder-strewn hillsides. There is the dainty *Purshia*, with little white wild rose flowers and leaves like tiny cloven hoofs; and all the flowering currants, some of which give us Christmas bloom; the blessed genus *Rhus*, the *Rhamnus*—and many other pleasant items of California's liberal largesse, the flowering shrubs.

(April 1935)

Neglected Native Plants

E. T. WHERRY

Pachysandra procumbens Michx.

The Japanese *Pachysandra* (*Pachysandra terminalis*) is now widely known to horticulturists as a ground-cover, and has undoubted merit for this purpose, at least when used in connection with large-scale plantings of shrubs. It is, however, too coarse and ungainly a plant for rock gardens and other restricted areas, where individual attractiveness is more important than mass effect. Moreover, it spreads rapidly by running rootstocks, and soon crowds out more delicate things which lie in its path.

One of the most notable facts brought to light by plant-geographic studies is the presence in eastern North America of numerous species closely related to those of eastern Asia; and the genus under discussion furnishes a good example. Tucked away in the southern Appalachians and adjacent physiographic provinces there occurs a member of that genus, appropriately named the Mountain *Pachysandra* (*Pachysandra procumbens*). This was discovered by Michaux in the course of his travels in this country in the late 1790's, but has never become widely known to botanists.

When the writer took up the study of the relations between plant distribution and soil reaction (acidity and alka-

linity), a special effort was made to locate such rare members of our native flora. The manuals of Botany give the range of the Mountain *Pachysandra* as from Florida to Louisiana and West Virginia,¹ as though it were a widespread plant; but for some time no clue to its exact haunts could be obtained. Ultimately, a mention of its occurrence at Somerset, Kentucky, was noted in an old account of it, and on visiting that place and making inquiries at the high school as to possible locations for it, a large colony was found a mile and a half north of the town, near the waterworks. The plant abounds there on rocky slopes, being most at home in the woods, but persisting even where the trees have been cut and the land pastured. The underlying rock is limestone and the soil reaction circumneutral, that is, either slightly acid or slightly alkaline, but never far from neutrality. Later, other occurrences were discovered, from this point southward nearly to the Gulf of Mexico, all situated on wooded rocky slopes along streams; but in many apparently favorable places it could not be found, so that the reason for its distributional behavior remains a mystery.

In many respects the Mountain *Pachysandra* is decidedly superior to its Japanese relative from the horticultural standpoint. Its rootstocks elongate but slowly, so that it stays

¹In a German serial devoted to plant geography, *Die Pflanzenareale*, R. 1, H. 7, K. 70, 1927, there is an article by Pax on the distribution of the Box family, to which the *Pachysandras* belong. The range of the present species is mapped as extending from Tennessee to New Jersey, but there is no evidence that this is other than an instance of carelessness in handling American geographic data, such as Fernald has pointed out in *Science*, v. 68, p. 145, 1928, to occur elsewhere in that serial.

where it is put, increasing by seedlings where conditions are favorable. Its evergreen leaves are of soft gray-green color, mottled with brownish green. In earliest spring it produces directly from the rootstock three-inch spikes of white flowers with dull pink anthers which, though individually small, are numerous enough to be conspicuous, as brought out in the place below reproduced from a photograph taken in the writer's garden in March, 1929. Such a ground-cover, which prefers shady places, is not particular as to

soil, is hardy far north of its natural range (at least to latitude 42°), bears attractively colored leaves, and blooms at such an early season as to permit its combination with *Chionodoxa*, *Muscari*, and *Scilla*, would certainly seem desirable for horticultural use. Yet it is rarely seen in our gardens, perhaps largely because of our tendency to prize more highly something that comes to us from a distant land, a tendency by no means discouraged by nurserymen. May this article lead to its more extensive introduction.

(July 1929)

Pachysandra procumbens

F. T. Wherry



Sabatia angularis (L.) Pursh.

During the hottest days of mid-summer there comes into bloom in abandoned fields and grassy meadows in many parts of the eastern United States a plant with flowers of such a striking rose-pink hue that it seems worthy of a place in our gardens. Following the general plan of *Standardized Plant Names* (in which this species is not included, since not in the trade) the

name Field Rosegentian may be suggested for it, although the country folk know it as Centaury. This usage has evidently been handed down from their ancestors, who, coming from England, were familiar with the plants so-called there, and were naturally unable to appreciate the technical differences on which botanists separate the two genera, *Centaurium* and *Sabatia*.

This lovely Rosegentian can not be successfully transplanted when fully grown, as is often attempted, because it is strictly biennial, and dies as soon as its seeds are ripe. Instead, seeds

Sabatia angularis

E. T. Wherry



must be collected in the fall, sown as promptly as practicable (they lose their vitality when allowed to dry out) and then left alone for a year. The first season nothing develops but a flat-lying group of four roundish, shining leaves, the whole but an inch or two in diameter. Protected from the cold by a thin covering of litter and by the snow, these rosettes survive the following winter without essential change, being hardly well up into the Great Lakes region. Then in the spring they begin to grow and send up a stem to a height of a foot or more, crowned with numerous showy flowers in July and August. Once the plant is established, it will self-sow and reappear in subsequent years, if conditions are to its liking. Care must be taken, however, that its rosettes are not weeded out by mistake, and that the bed where it grows is not limed nor heavily fertilized, for it requires a somewhat acid and sterile soil.

(October 1929)

Hexastylis arifolia (Michx.) Small.

The litter under Rhododendrons, Kalmias, and other shrubs of similar soil preferences is usually so acid that it discourages the growth of most ground-covering plants, leaving the surface brown and bare. In some situations the effect of the shrubbery can be improved by putting in tolerant creepers which spread into extensive colonies, such as Bugle (*Ajuga*), Ivy (*Hedera*) and Periwinkle (*Vinca*). Under other conditions, however, and especially in restricted plantations, ground-covers which form individual patches may be more desirable. Several of our native species are decidedly ornamental when used in this way, but have not received the attention they deserve. One of these is being made the subject of this note.

The genus *Asarum*, as founded by Linnaeus, includes two distantly related

sets of species, one having deciduous leaves and long-stalked flowers with their styles united, and the other, evergreen leaves and short-stalked flowers with separate styles. Recognizing the distinctness of this second group, Rafinesque applied to it the genus name *Hexastylis*, and as any layman can readily distinguish the two, it seems desirable to keep them separate in horticultural classification as well. The common name Wildginger, used in *Standardized Plant Names* for all of these plants, may then be restricted to the deciduous genus, *Asarum*; to the evergreen one, *Hexastylis*, it seems appropriate to apply the name by which its members are universally known in the south, namely Heartleaf.

The most attractive member of this group, the Arum Heartleaf, is a native of open woods in many parts of the southeastern United States, ranging north only to the southern edge of Virginia, though reaching sufficiently high altitudes in the Alleghenies to indicate a considerable degree of hardiness. It blooms in early spring, the flowers being curious little jug-shaped, bronzy-green objects; lying as they do, crowded close against the crown of the plant, they suggest a litter of tiny new-born animals, and the species is locally known as the "little pig plant." At this season the leaves of the preceding year are prostrate on the ground, but fresh ones rapidly take their places as they wither, so that the plant is always ornamental. Each stem bears but a single leaf at a time, but as numerous stems radiate from one crown, a mature plant takes on a striking rosette habit. This is shown in the illustration, which represents one about ten years old in the writer's garden, two feet in diameter and six inches in height. The leaves are attractively mottled with white, somewhat suggesting those of the Persian Cyclamen, and forming a pleasing contrast with the brown litter beneath, especially during the winter.

Propagation can be accomplished by division of the fleshy crown with a



E. T. Wherry

Hexastylis arifolia

knife, or by collecting and planting seeds. As to soil, the chief requirement appears to be a moderate degree of sterility. The plant pictured originally grew in a clayey soil under shrubs in a Georgia pine forest, and has been transplanted into a similar situation, the needles being allowed to accumulate around it. The soil reaction is here, of course, decidedly acid, but high acidity does not seem essential, for another clump was collected in neutral clay on a Tennessee limestone barren, and is thriving in soil of that character. One or two

dealers in native plants in the North Carolina mountains supply this species as well as its relatives, Virginia Heartleaf (*Hexastylis virginica*) and Mountain Heartleaf (*H. shuttleworthi*). The two latter differ from the one here pictured in having more rounded leaves and bell-shaped flowers. All of the species vary considerably from one individual to another in the outline and degree of mottling of leaves, and any one who has in his garden a bare spot under shrubs will find it worth while to try out a few of these interesting Heartleaves.

(January 1930)



E. T. Wherry

Heuchera pubescens Pursh.

The genus *Heuchera* (correct pronunciation hoyk-sheer-a) is represented in most rock gardens by one or more varieties of Coralbells (*H. sanguinea*), but other species are rarely seen in cultivation in this country. The flowers of most of them, it is true, are without ornamental value; but the foliage is often decidedly attractive. They have the additional merit of thriving in the shade, where few of the much-used rock plants will grow at all; and they are more or less evergreen and relatively free from pests.

One often hears of a rock gardener endeavoring to bring together a complete collection of some genus, as for example *Sedum*, or *Primula*, or *Dian-*

thus. Since, however, these genera include hundreds of species, many of them native to remote parts of Europe, Asia or Africa, real completeness is practically impossible to attain. If a group like the *Heucheres* were selected, instead, a full representation might be hoped for, since there are only about 75 species known, and these are all native to the United States and Mexico.

Some of the species have round-lobed leaves, and are often popularly referred to as "rock-geraniums"; others show sharp or jagged points to the lobes. In some the foliage is smooth, in others densely hairy. Perhaps the most striking of all is the one here pictured, which has leaves with dark green or maroon veins on a gray background, no two individuals being marked exactly alike. It is a native of deeply-wooded limestone ledges in the Appalachian region, but, as the illustration shows, has taken kindly to a shaded heap of rocks in the writer's garden.

(July 1930)

Shortia galacifolia Torr. & Gray.

This little plant was first collected by Michaux in the Carolina mountains in 1788, and lay unnamed in his herbarium for many years, until brought to light by Asa Gray. Although only a few leaves and a single seed-pod were preserved, Gray recognized its relationships, and predicted what its flowers would be like. In 1877 it was accidentally rediscovered, along the Catawba River, by a school-teacher who brought it to the attention of scientists. As a result, before the end of his life Gray had the satisfaction of seeing it in its native haunts and of finding that his predictions as to its features were quite correct. Nearly a century after Michaux's first find, the original colony, at the head of the Keowee River, was located by the late Professor C. S. Sargent.

The standard name assigned refers to the bell-shaped flowers and to the abundance of the plant along the Oconee River. The mountaineers who dig it to supply the horticultural trade know it as One-flowered Coltsfoot, or Bearsfoot, or often simply as "Shorty," a corruption of its genus name. The technical nomenclature is clouded by the fact that the name *Shortia*, in honor of Dr. C. W. Short, an eminent botanist of the early 1800's, had been used by Rafinesque for a Cress five years before Torrey and Gray applied it to the present plant. Dr. H. D. House has accordingly proposed to rename the latter *Sherwoodia*, an unfortunate choice in that the amateur botanist to whom the name refers has never made any notable contributions to science, and the association with this plant attributed to him appears to have been without foundation.

Whatever name may ultimately be selected for this plant by nomenclatorial specialists, its horticultural value is well established. It will not thrive in the ordinary garden border, requiring an acid, humus-rich soil and shade, but it forms a splendid ground cover under Rhododendrons, Kalmias, and coniferous trees, which yield a welcome

protecting litter. The glossy evergreen leaves become delicately bronzed by winter's cold, setting off the lovely white or pinkish, bell-shaped flowers, which appear in earliest spring.

Several dealers in native plants list *Shortia*, although unfortunately they do not propagate it to any extent, but obtain their material from the wild. The continual digging for this purpose, together with the devastating fires repeatedly set in the woods because of a mistaken notion that they are beneficial, are rapidly destroying its native colonies. If, however, its soil preferences are taken into account, it can be readily increased by root divisions, cuttings, or seeds. Every one who has a shady wild garden where the soil is acid and the litter is allowed to accumulate should introduce and encourage this plant, and so aid in its preservation.

E. T. Wherry (April 1930)



The Stewartias

Stewartia pseudocamellia

Josephine Henry



The *Stewartias*, deciduous, upright-growing little trees of the THEACEAE are an exceedingly attractive group, any one of which is capable of embellishing the small piece of ground.

There are about nine species of *Stewartias*. Two of them are natives to our eastern states. The others come from China and Japan.

These beautiful small trees are so adaptable and easily grown, it is rather surprising they are so seldom seen. They thrive in almost any good soil, provided it contains no lime, and is not too dry, and they are not averse to a little shade.

All these *Stewartias* are perfectly hardy and have stood out during sub-zero temperatures, with once a drop to 20 below. They have had no protection of any sort whatever.

In the many years I have grown them, they have never lost a twig or a bud by winter killing.

Sometimes they are rather slow growers. They are usually handled in small sizes, and for this reason spring planting is preferable.

Some of the *Stewartias* are procurable in high class nurseries. They should always be moved with a ball of earth covering their roots and then they quickly make themselves at home. If they are very small, however, I plant them where they can conveniently be watered and kept free from weeds, until they are large enough to fend for themselves. All are compact growers and require no trimming or pruning at any season.

So far as my knowledge goes, the only insects that trouble them are those wickedly voracious pests, Japanese beetles.

Stewartias, first cousins of *Camellias*, bear flowers closely resembling single blooms of the latter. Their large handsome flowers often three or four inches in diameter, are slightly cupped and are composed of about five almost circular, pearly-white petals with a wonderful satiny finish and with long silky hairs on the outside surface. The edges are often crinkled and slightly toothed in a most attractive fashion. The center is invariably a showy mass of fluffy stamens that add immensely to the appearance of the flowers. They flower in June and bloom with unfailing regularity when happily situated. The blossoms are usually short lived, the flowers of some species falling at the end of one day; but their exquisite beauty, while they last, more than compensates for this defect. The alternate ovate leaves are about three to five inches long, and slightly toothed along the margins. In the autumn they color up well, taking on various shades of reds and yellows. The smooth gray bark flakes off in an interesting way, making them conspicuous trees, especially in winter.

Stewartia pentagyna is the *Stewartia* most commonly seen, not only because it is the easiest one to procure, but also because it is one of the handsomest. This beautiful little tree is native to the Blue Ridge Mountains, and grows naturally in rich woods. It is a slender, upright grower, reaching about twenty feet in height, in its native home. The flowers of *Stewartia pentagyna* remain open for two days.

Stewartia pentagyna grandiflora is a fine variety of the type which bears larger flowers. Instead of the usual bunch of yellow stamens, the flowers of this variety contain purple stamens, which give a very sprightly appearance to the flower. My tree is about 10½ feet tall and has been growing here for about nine years.

Stewartia malocodendron is another



Stewartia pentagyna

Josephine Henry

native species. It seems equally as hardy here as *Stewartia pentagyna*, surviving the recent cold winters in good shape. However, as this species comes from the woods of the Coastal Plain in a more southerly latitude than *Stewartia pentagyna*, it would probably not survive as far north as that species.

Stewartia malocodendron was first cultivated in 1752, and it does seem surprising that, although a native, it is still a rare tree!

Stewartia pseudocamellia, from Japan, is a robust-growing tree, reaching

a height of 60 feet in its home. Probably in our part of the country with fairly severe winters, it would not reach that height. For the more southerly states this should, indeed, grow into a noble tree, in time. The largest specimen here is about twenty feet tall. It has been in my possession for over twenty years and has been moved twice.

Stewartia monadelphica, another member of this handsome family, was brought from Japan in 1916. This *Stewartia* is the giant of the family and attains the surprising height of eighty feet in its native land.



Josephine Henry

Stewartia koreana

The blooms, about $1\frac{1}{2}$ inches in diameter, are, however, just as beautiful and the dainty leaves are only about half the size of those of *S. pentagyna*.

It seems strange that this, the largest member of the family, bears the smallest flowers and foliage.

My plant was given to me about five years ago. It was just an infant then, but without any especial care it is now over six feet tall.

Stewartia koreana is the newest of the above Stewartias. It was brought into cultivation in 1918. As its name denotes, its home is in Korea. The

maximum height of this tree is about fifty feet. It bears flowers that are perhaps larger than those of any other *Stewartia*.

My plant of this, too, was a most appreciated gift that came to me six years ago. It is now over twelve feet tall and this summer it bore twenty-seven of its handsome flowers.

Stewartias are precious trees of inestimable value for either small plot or large estate. They should be planted more frequently and, being long lived, will be enjoyed by generations for years to come.

(April 1938)

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Kalanchoe aromatica

Claude Hope

Kalanchoes for the Window Garden

CLAUDE HOPE

Each year, during the winter, one frequently sees articles devoted to house plants and window gardens. By such means the list of suitable house plants has grown to be a long one, yet one seldom sees any mention of the genus *Kalanchoe* as a source of suitable plants.

To focus attention on these plants, so admirably suited to living room conditions, this brief survey has been prepared, illustrating and describing several fascinating species with which possibly the window gardener is unacquainted.

Kalanchoes possess most of the characteristics of make-up and behavior that are essential to good house plants. They grow best and flower during the winter months. Because they are all succulent, they do not object to dry atmosphere, nor to rather rapid and wide variations in soil moisture. They like living-room temperatures. They seem to tolerate, for the most part, living-room light conditions, even though they need more sunlight than many of the "cast-iron" house plants. In addition to these essentials, they present various attractive features in flower or leaf characters. Those win-

dow gardeners who like to collect related species will find *Kalanchoes* to their taste. Probably 30 species can be obtained at the present time by diligent search, and there is always the chance of getting one of the other 75 or more species.

The genus *Kalanchoe* belongs to the subfamily *KALANCHOIDEAE* of the *CRASSULACEAE*. By some authorities, the genus includes all the members of this subfamily; by others, the genera *Bryophyllum* and *Kitchingia* are separated from *Kalanchoe*. The latter treatment by Alwin Berger (1)¹ is followed here. The subfamily is distinguished from the rest of the *CRASSULACEAE* by the four-parted flowers with stamens in two series of four each. The three genera may be separated by the following abbreviated key:

1. Stamens inserted at the base of the tube; flowers mostly pendulous, large; calyx large, often tubular, or inflated tubular. The leaves almost always produce plantlets in the margins *Bryophyllum*
2. Stamens inserted about the middle of the tube or above
 - a. Ovaries spreading; styles long; corolla tube inflated-campanulate; flowers more or less pendulous *Kitchingia*
 - b. Ovaries contiguous, styles often shorter than ovaries; corolla various, usually urceolate at the base. Flowers nearly always upright

Kalanchoe

¹Numbers in parentheses refer to literature cited at the end of this article.



Kalanchoe beharensis

Claude Hope

In this issue only the Kalanchoes will be discussed; representatives of the other two genera will be considered later. Most of the species included here are available in the trade, and only a few species are omitted here that may be purchased in this country.

The cultural requirements of these plants are simple. A light, well-drained potting soil is best; a good mixture would be equal parts of leaf soil, loam and fine sand. Results, so far, indicate that soil reaction is not important. The plants illustrated here were grown in a distinctly acid soil. Equally good plants of a few species have been grown successfully in alkaline soil.

Although the plants are succulent, they require moderately good soil moisture during the season of active growth in the fall and early winter. Following the flowering season, most species are almost dormant until mid-summer, and during this period little water is required. The succulent nature of the plants is helpful, however, if one wants to abandon them over the week-end, or, better still, if one forgets to water them! For best growth, and particularly for flowers, they should be grown in the sunniest windows. If garden space is available, the plants may be plunged outdoors during the frost-free period.

Few plants are more easily propagated than most of the Kalanchoes. Either shoots, leaves or seeds may be used. Cuttings may be rooted any season of the year, but for good plants during the winter, it is better to start the young plants in July or August. If leaf cuttings are used, it is better, in most cases, to take entire leaves, with the petioles attached. However, leaf fragments produce plantlets freely in several instances (*K. tomentosa*, *K. beharensis*, *K. orgyalis*). Plantlets are produced on the roots of some species, notably *K. tomentosa* and *K. beharensis*.

A few species of the group have a world wide distribution in the tropics, but most of them are confined to Madagascar and/or South Africa. None of the species is hardy and will not survive a frost severe enough to reach the crown of the plant. Out of doors in California and Florida, their flowering season for the most part is late fall and early winter. In the greenhouse it varies with the species from fall to spring.

Kalanchoe aromatica Perrier (see page 222) from Madagascar is one of the less attractive species of the group, both in foliage and in flower, and is remarkable only for its aromatic glands. Its petiolate leaves are triangular-lanceolate, with small dentate-crenate margins. The flowers are of moderate size for the genus with greenish-white ovate corolla lobes about 1 cm³ long and about 6 mm wide sharply reflexed against the tube and marked with reddish-purple veins which converge at the base to form almost a blotch. The tip of each segment is cupped into a hoodlike pouch such as is found in some crassulas. The entire plant, except for the corolla, is covered with gland-tipped hairs of various lengths. These exude an aromatic secretion that makes the plant sticky to the touch and gives it an odor much like that of pine resin. This is one of the small perennial species that grows well only during the winter. The flowers come in late November and December in the greenhouse near Washington, D. C.

Kalanchoe beharensis Drake del Castillo (page 224) is a species that eventually attains the proportions of a small tree. Madagascar collectors have noted specimens as tall as 20 feet, often with several branches. Young plants are very handsome, and the old plants

³For the benefit of those unfamiliar with the metric scale, 1 cm equals 10 mm and, roughly, 2.5 cm equal 1 inch.



Kalanchoe blossfeldiana

Claude Hope

are striking, if not handsome. For several years this plant has been sold under the erroneous name of *Kitchingia mandrakensis*, a name which belongs to a plant quite unlike this kalanchoe. *K. beharensis* has, perhaps, the largest leaves of the genus. Occasionally they are as much as 40 cm long and 40 cm across the base, where they are widest. The leaves are, in general, broad-triangular-hastate with a peltate attachment of the almost terete petiole, and margins vary from crenate-sinuous to pinnate lobed. The one illustrated is intermediate in form. The gray-green color is almost obscured by the dense mass of short-stalked, three-branched hairs that cover the entire plant. These hairs are usually a pleasing rusty brown on the upper surfaces of the leaves and silvery gray below. The pubescence often is shed from old leaves and stems in rather large tufts. As a rule the stems have no more than eight or ten pairs of leaves at any one time. The available illustrations of the plant in its native habitat in the desert of southwestern Madagascar show it with only two or three pairs of leaves. The stem has one peculiarity worth mentioning. The leaf scars are enlarged and somewhat projecting, almost triangular in shape, and they are provided, at each of the angles, with stout, short, and hard spine-like structure.

The indoor gardener, obviously, would need to replace his plants occasionally with smaller plants. However, this is easily accomplished, either by potting off the young plantlets produced by the roots around the edge of the pot, or by leaf cuttings, either of whole leaves or of portions, or by taking the top of the plant as a cutting. This plant needs more sun than do most members of the genus and, on that account, would respond to plunging out of doors during the summer. It is not likely to flower, but, as the

flowers are scarcely ornamental, that is not a serious objection.

Probably most people interested in plants are familiar with *K. blossfeldiana* von Poellnitz (*K. globulifera* var. *coccinea* Perrier) (page 226), a comparatively new arrival among kalanchoes in this country. Those who do not know the plant by name will recognize in the picture the familiar Christmas Kalanchoe. Commercially, this is easily the most important species of the genus and is so well known as to need no description. Florists prefer to propagate this one by seeds, which are produced abundantly. However, the plant is a short-lived perennial and may be propagated easily by cuttings.

Kalanchoe bracteata Scott Elliott (*K. nadyae* Hamet), (page 228) is found in approximately the same portions of Madagascar as is *K. beharensis*. It, too, is woody but there the similarity ends. In some respects this is one of the more attractive species of the genus. It is a much branched, small shrub which in nature attains a height of at least five feet, and perhaps more, but its maximum size does not seem to be recorded anywhere.

The leaves are rather variable in appearance due to the presence or absence of a covering of closely appressed scalelike hairs. Sometimes these hairs are dense enough to give the leaves a silvery-white appearance; comparatively early in the life of the leaf, however, this covering is shed. The leaf then is rich dark green, glossy, and entirely glabrous. Usually 20 to 40 mm long and 15 to 20 mm wide, the leaves are ovate to ovate-orbicular, acutish to obtuse above, and rounded below or tapering abruptly into a narrow petiole about 5 to 7 mm long. The margins are entire, without a suggestion of indentation. The leaves are less fleshy in appearance than those of most species, but they are still distinctly succulent. The stems are terete and moderately



Kalanchoe bracteata

Lilian A. Guernsey

woody; in the latter respect they, too, are scarcely characteristic of the genus. Shoots that have grown rather rapidly have fairly long internodes, but, on the whole, the plant presents a pleasing leafy appearance.

The flowers of *K. bracteata* are very pretty. They are borne erect in a paniclelike inflorescence, from 3 to 5 cm long and 2 to 4 cm across, composed of three to five dense, short-branched cymes. The corolla is an inflated urceolate tube about one cm long with four small reflexed, orbicular lobes. The color is near ruby red in the upper portion, but in the lower part, paler, with a greenish tint.

This species may be propagated either by leaf or shoot cuttings or by seeds. Its flowers come in February in the greenhouse. The plant shown on page 228 is a young cutting that flowered within a few months after it was rooted. Consequently, the photograph does not show the typical habit of the plant.

Kalanchoe crenata Haworth (page 230) is one of the species distributed throughout the tropics of the world, with its chief centers in South Africa and in India. No exception to the usual situation in widely distributed plants, this species has accumulated a number of botanical names. No effort will be made to list them here, however.

The plant is one of the less attractive members of the group and is not appreciably better looking when in flower. It is a herbaceous perennial, producing new flowering growths from the base each year.

The moderately thin, petiolate, glabrous leaves are usually ovate to elliptical, 5 to 8 cm long and 4 to 5 cm wide. Their margins are doubly crenate-dentate. Their color is a dull dark green. Above the sixth to tenth pair of leaves, the internodes are rather

abruptly elongated to form the long slender peduncle which carries two or three pairs of bracteate leaves. At the same time the stem, which is glabrous below, develops a fairly dense covering of simple and glandular hairs. This pubescence extends to all parts of the inflorescence including the calyx, but not the corolla.

The inflorescence, very well shown in the illustration, is composed of a number of indeterminate one-sided racemes arranged in a panicle. The pedicels are short, moderately slender, and support the flowers in an upright position. The corolla, with a greenish yellow tube about 10 mm long, has bright yellow lobes about 3 to 4 mm long, standing at right angles to the tube.

Kalanchoe crenata may be propagated by cuttings or seeds which are produced freely. In greenhouses where it is permitted to seed, it self-sows readily, and may become a weed. The flowering season is long, extending from January to as late as June. The plants are almost dormant from June to August, and during that period have only a rosette of one or two pairs of leaves. It might be summed up by the statement that it is a species primarily for the collector.

Kalanchoe flammea Stapf (page 231), in contrast with *K. crenata*, is one of the most attractive members of the group. Hamet (6), in his monograph, included this with the extremely complex and polymorphic *K. laciniata* (L.). De C. Berger (1), however, segregates it from the complex, and surely he had ample reason for so doing. There is a beautiful illustration of this plant in the *Curtis' Botanic Magazine* (3).

It is a glabrous plant throughout. The cupped leaves, not greatly unlike those of *K. blossfeldiana*, are ovate, obtuse, rounded at the base except for



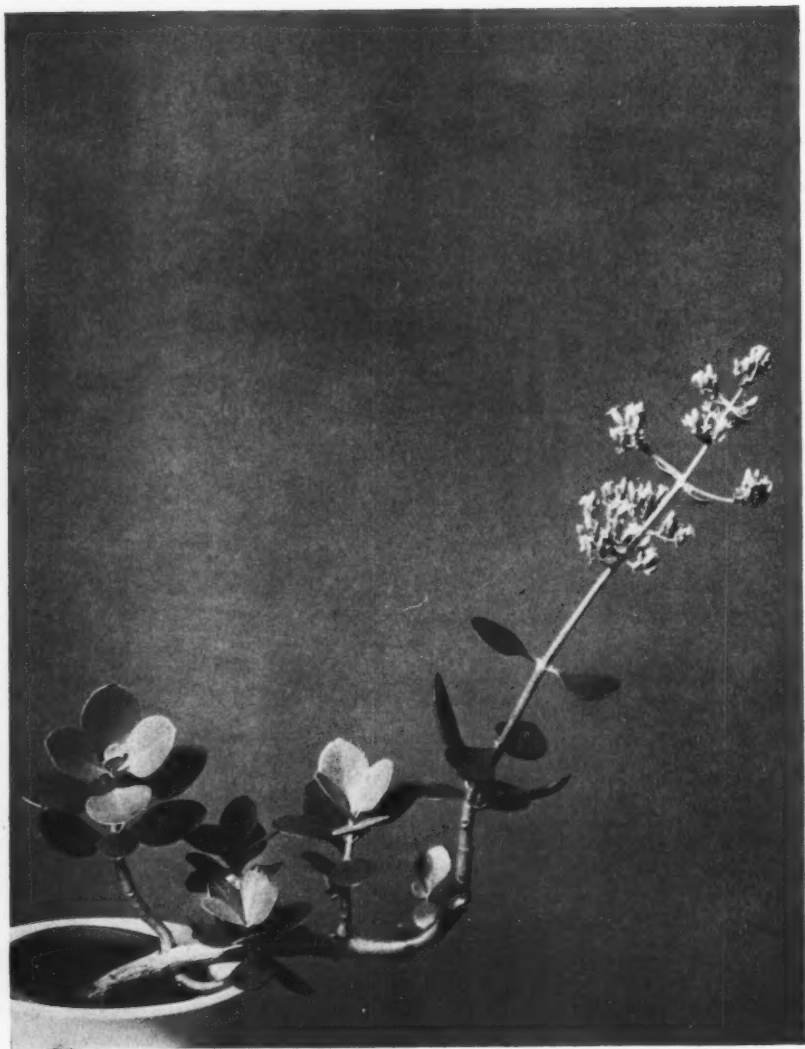
Kalanchoe crenata

Lilian A. Guernsey



Lilian A. Guernsey

Kalanchoe flammea



Kalanchoe hildebrandtii

Claude Hope

the abrupt taper to the petiole, and obscurely sinuate-crenate on the margin. They are light, clear green, with surface texture that is dull, but not glaucous. The petiole is not over one cm in length, and rather broad. Like most species of this genus, the inflorescence is borne on a long peduncle which carries two or three pairs of small bractlike leaves. The flowers are in a rather dense, corymbiform cyme. The calyx is scarcely tubular and its segments are sublinear, not over 4 mm long. The corolla is large and showy. The pale yellow tube is 10 to 12 mm long and almost cylindrical, except for the faint four angles. Its lobes spread at right angles to the tube, and are broad ovate, and acute. The open flower frequently measures as much as 20 to 25 mm across. The color varies a little in shades of orange to scarlet. Sometimes it gives the effect of bright orange faintly washed with red and at other times it is a rich scarlet.

As a cut flower, *K. flammea* is valuable both for its fine color and for its unusual keeping qualities. On the plant an inflorescence may remain attractive for two months. While they won't last that long when cut, they may be expected to keep in good shape for about two weeks. Its one fault in this respect is that it flowers during March and April when flowers are plentiful. It stays almost dormant from about July until late January.

Kalanchoe hildebrandtii Baillon (*K. gomphophylla* Baker), (page 232), is a shrubby plant rather similar in vegetative growth to *K. bracteata*, to which, indeed, it is closely related. Its leaves differ chiefly in being ovate, obtuse, gray green, and in retaining the triparted, scalelike pubescence. The flowers are not as attractive by any means as those of *K. bracteata*, and they are very small, measuring about 3 to 5 mm in length, and are pale greenish yellow. They are borne in dense cymes ar-

ranged in panicles.

This is a woody species of very slow growth. In its native habitat in Central Madagascar, it attains the proportions of a small tree, often surpassing 5 meters (16.5 ft.).

Kalanchoe longiflora Schlechter is a native of Natal, South Africa. A very good illustration is to be found in Wood's Natal Plants (12). There is some indication that this plant may be masquerading as *K. somaliensis* in some of the western nurseries.

It is a fairly robust glabrous plant, with perhaps more leaves than many species. The leaves are broad ovate to orbicular, coarsely and sharply dentate except for the basal third, subsessile, and about 7 to 8 cm long, and 5 to 6 cm wide. They are light gray green sometimes slightly reddened by exposure to the sun. The stem is distinctly four angled throughout. It attains a height of about 60 to 75 cm, over half of which is in the peduncle and inflorescence.

The inflorescence is the typical paniclelike arrangement of moderately dense, many-flowered cymes. As in most kalanchoes, the calyx is very small. The corolla has a four-angled, greenish yellow tube about 16 mm long and four bright yellow, orbicular mucronate segments about 3 mm long. The anthers have minute spheres attached at the tip, a feature seen in only a few other species.

When in full flower, the rather massive inflorescence of this species is mildly attractive. In a vigorous vegetative state, the glossy, luxuriant, gray-green foliage is pleasing. In no way, however, is the plant particularly striking in comparison with several of the other species.

Kalanchoe marmorata Baker (see pages 234 and 236), when well grown, is one of the distinctly handsome species of the group. It is native to Erythrea, Ethiopia, and Somaliland, in the moun-



Kalanchoe marmorata

Lilian A. Guernsey

tains for the most part. *K. macrantha* Baker, *K. grandiflora* A. Rich, and *K. somaliensis* Hooker f. are all included under this name by Hamet, but Berger (1) distinguishes *K. somaliensis* as a species with leaves larger, lighter colored, more shallowly sinuate-dentate, less flecked or mottled with reddish brown, and with a corolla tube cylindrical rather than rectangular in the upper portion.

K. marmorata is illustrated in *Curtis' Botanical Magazine* in 1894 (2) and *K. somaliensis* is illustrated in the same magazine in 1902 (5).

The leaves of *K. marmorata* shown on page 234 are held erect against the stem, each pair very much overlapping the pair directly above. The length is from 10 to 15 cm and the width is from 6 to 8 cm. The rich maroon-red to red-brown mottling of the leaves, chiefly on the under surface, contributes greatly to the ornamental value of this species. The blotches are very irregular in shape and in position, but occasionally one can distinguish a sort of pattern of three bands of blotches. One band of smaller blotches runs around the margin, each blotch falling on the sinus of the marginal crenations. The other two, of larger blotches, are roughly concentric with the outer. The upper surfaces are only flecked, and that irregularly, except for the marginal sinuses, each of which is colored.

The white flowers with their long, slender corolla tubes are just as striking as are the leaves (see page 236). Usually in a simple, once branched cyme, they are held erect on pedicels 2 to 4 cm long. The calyx is composed of four, almost free, linear-lanceolate segments about 15 to 18 mm long. The corolla tube is usually over 7.5 cm long, and some as long as 10 cm have been observed; it is about 8 mm across at the lower end and about 5 mm at the base of the lobes. The lower portion is

greenish, and upper portion is white, sometimes blushed with red. The lobes are pure white margined occasionally with red, ovate, longly acuminate, about 2 cm long, and they stand at right angles to the tube.

Unless staked, the older stems are likely to become trailing, due to the weight of the leaves, which sometimes number 12 to 15 pairs. The plant is a true perennial, and in established plants new stems will always be found near or at the crown. The flowering season seems to be from late November to January. How well it will flower as a house plant is a question, but it is always attractive as a foliage plant.

Kalanchoe orgyalis Baker (*K. antanosiana* Drake del Castillo) (see page 237) is a native of southwestern Madagascar, where it grows as a sparsely branched shrub 4 to 5 feet high. It is closely related to *K. bracteata*, and less closely to *K. hildebrandtii*. In its vegetative stage, it unquestionably is one of the prettiest of the group, and it shares with *K. beharensis* the distinction of being the most unique of the group. It is a plant that will always draw the attention of those unfamiliar with it. The species name, incidentally, means the length of the arms extended (about 6 feet).

The leaves are somewhat variable in appearance, depending upon their age. When young, they are completely covered with a sort of membrane made up of scalelike hairs similar to that of *K. bracteata*. This membrane is light silvery bronze at first, but it soon changes to a pleasing rusty bronze. In the older leaves it becomes gray, only partially hiding the dull green of the leaves and later, on the oldest leaves, it falls away. The leaf blade is from 8 to 15 cm long and from 4 to 8 cm wide. It is very thick, frequently as much as 1 cm, and very brittle. Those who grow this plant must be careful not to drop it; it would shatter like glass. The shape is



Flowers of Kalanchoe marmorata

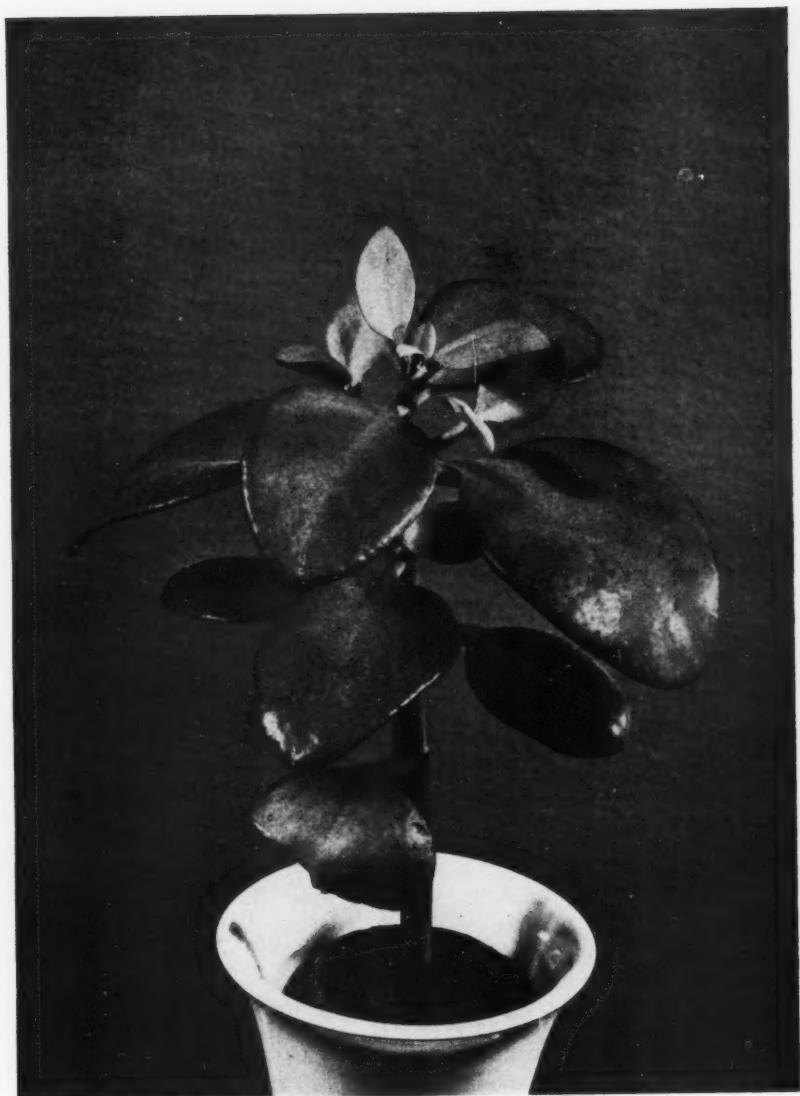
Claude Hope

very well shown in the photograph.

The small flowers add nothing to the appearance of the plant and deserve only brief mention. They are carried in dense cymes on moderately short peduncles arranged in a panicle. The color is pale greenish yellow. The

plants flower only rarely, so one will not see them often.

The growth is slow and the plants are more resistant to drying than are most kalanchoes. Plants from which water has been withheld for a month showed scarcely any evidence of with-



Claude Hope

Kalanchoe orgyalis

ering. The species is easily propagated from leaf fragments; tiny pieces will produce plantlets even on a window sill!

Kalanchoe rotundifolia Haworth (right) is one of the lesser forms and deserves only passing comment. It is a small plant, native to the Cape of Good Hope and to Socotre. Its one commendable feature is that it flowers regularly and usually several times a year, from early fall to late March. It may be said that this species, like *K. crenata*, is one for collectors primarily.

Its leaves are obovate, entire, subsessile, small, 2 to 3 cm long, and dull gray green. The plant is slender and the stem is simple at first, but by late winter it may have two or three pairs of branches. It may vary in height from 20 to 40 cm, one-half to two-thirds of which may be in the slender peduncle.

The inflorescence is a once- to thrice-branched, few-flowered cyme. The cinnabar-red flowers have a corolla tube about 8 mm long with small ovate lobes about 4 mm long, standing at right angles to the tube. In withering, the corolla twists tightly, a peculiarity noticeable in only one or two other species.

Kalanchoe sexangularis? N. E. Brown furnishes a note of cool, clear, luxuriant green to a collection of kalanchoes. It is not a common foliage color in the group; most species are either glaucous, hairy, dull, or marked in some fashion. This one, though, has the glossy surface texture and color of a peperomia or of *Begonia semperflorens*. When grown in good light, the stems are colored a pleasing red which furnishes an accent tone.

Although not certain of the species identification for want of illustrations or comparative material, the author believes this to be *K. sexangularis*. If so, its native home, though not defi-

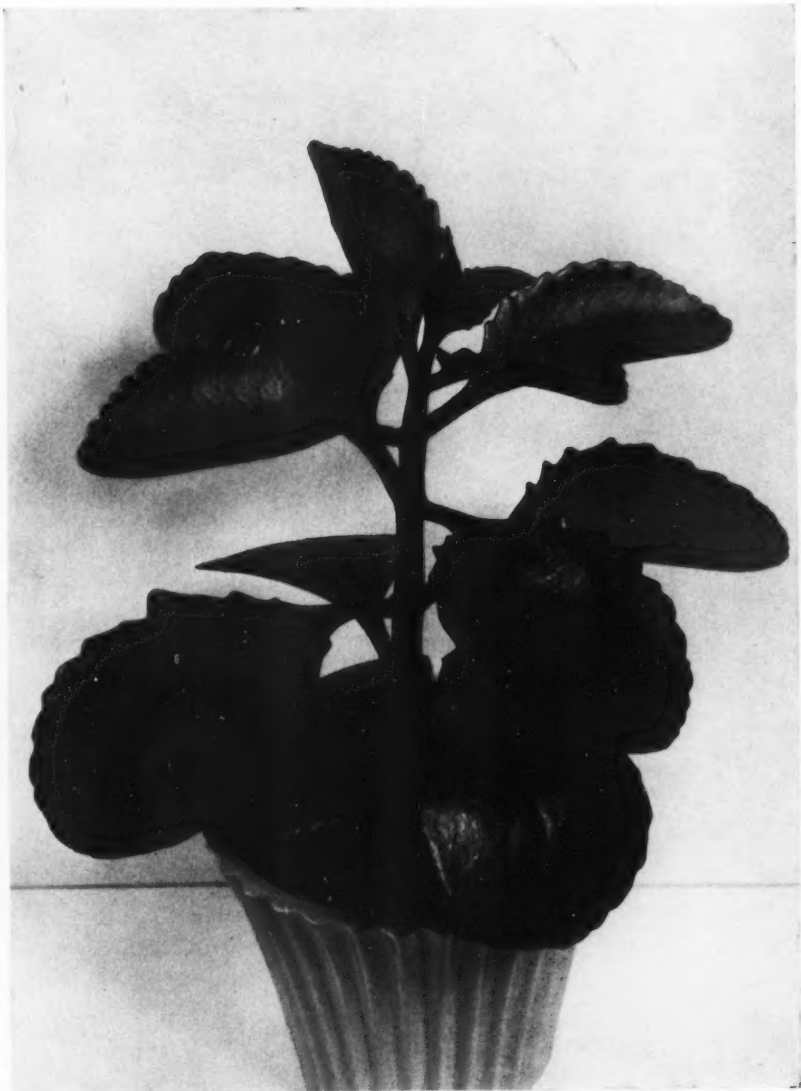


Lilian A. Guernsey

Kalanchoe rotundifolia

nately known, is believed to be South Africa. It is apparently related to *K. longiflora*, a less attractive plant.

The leaf shape and margin characteristic may be easily seen in the illustration. The flowers are not particularly enhancing. They are borne on a long, slender-bracted peduncle, the cymes arranged as a panicle. In outward appearance, the flower seems to



Lilian A. Guernsey

Kalanchoe sexangularis

be mostly green corolla tube, the yellow expanded lobes being very small.

Kalanchoe sp., the identification of which has been impossible so far, is a small, slender, glabrous plant of only ordinary worth. It seems to be closely related to *K. rotundifolia*, but definitely superior to it. Its small leaves are a cool, pleasant green, 4 to 5 cm long, 3 cm wide, obovate, obtuse with two or three pairs of broad, rounded crenations on the margins of the upper half. Occasionally leaves are found that are obscurely three lobed. The petiole is slender and as much as 2 cm long. The leaves, to the number of 8 or 10 pairs, are crowded on the lower 15 cm of plant, and, as usual, the upper ones are smaller.

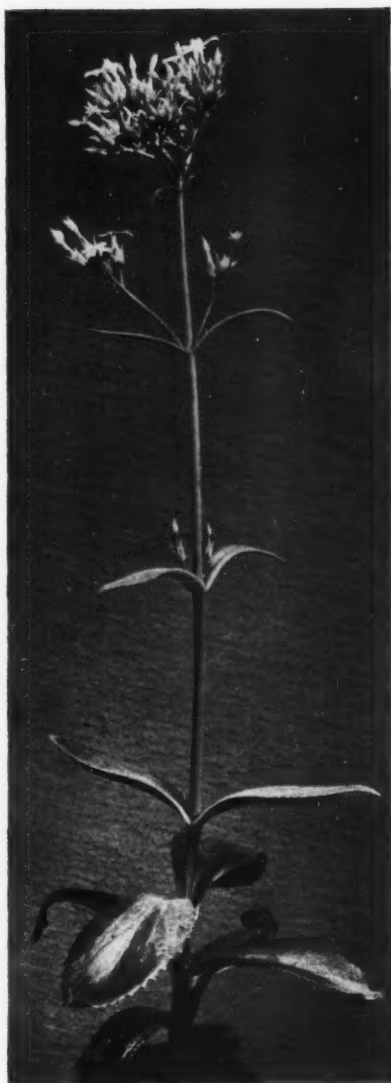
The illustration shows the character of the inflorescence and the habit of the plant, and it seems unnecessary to describe those features. The individual flowers are small, but rather effective *en masse*. The slender corolla tube is 6 to 8 mm long, and the lanceolate-acuminate segments are from 3 to 4 mm long. The segments are rich yellow to orange yellow, sometimes slightly tinted or washed with red. In withering, the corolla twists tightly, a feature of *K. rotundifolia*.

The flowers seem to have some value for cutting, where the plant can be grown in quantity. Like *K. rotundifolia* and unlike most other species, it flowers two or three times during the winter, flowering first in late September, and for the last time in April.

Kalanchoe spathulata D. C. is another species for the collector. It is one Hamet (6) buried in the *K. laciniata* conglomerate, but as that group is ill defined and includes a great range of variations, it seems best to retain this name here. It is distributed throughout the tropics of the world and, accordingly, it has been known by various names.



Kalanchoe sp. Claude Hope



Claude Hope

Kalanchoe spathulata

In many respects it is similar to *K. crenata* and certainly is closely related to it. As an ornamental plant, it is

even less satisfactory, except for the larger flowers. The basal leaves, dull gray green, are 10 to 15 cm long and 5 to 7 cm wide, elliptic-lanceolate, acutish, and narrowed gradually to the sessile, stem-clasping base. The margins are doubly serrate, conspicuously so in the upper half.

The flowers are in a moderately dense, twice-to thrice-branched cyme. The corolla tube is about 15 mm long, distinctly urceolate, and the bright yellow acute lobes are 6 to 8 mm long. The peduncle supporting the inflorescence is 40 to 60 cm long and has 2 to 4 pairs of lanceolate bracts (see page 242).

Kalanchoe synsepala Baker (see page 244) is a native of Central Madagascar, where it is said to occur in several isolated localities. In each locality the growth is said to vary in some way from all other populations. Consequently, several species have been described that probably belong here. (9)

The plant has a very short stem, even after several years of growth; the internodes are so short that the sessile leaf bases touch those of the adjacent pairs. The main vegetative stem apparently does not branch in the usual sense, but it does send out axillary flowering stems and axillary stolons.

Six leaves are produced each season: four normal ones at flowering time in December or January and two reduced ones later in the spring, the dry season of its native home. Presumably, in outdoor plantings, the leaves form a nearly flat rosette on the ground, but in pots they fold down against the pot, as shown in the illustration. They are pale, glossy green in ours, but *K. gentyi* Hamet et Perr., said by Perrier de la Bathie (9) and later by Humbert (7) to belong here, has pubescent leaves. The leaves are sometimes as much as 30 to 40 cm long and 15 to 20 cm wide; they are broad ovate-lanceo-



Kalanchoe spathulata

Lilian A. Guernsey

late to lanceolate, acute, and narrowed gradually to the sessile, stem-clasping base. Their margins are coarsely and sharply dentate when young, but after full size is reached they are only sinuous-dentate. On some plants the margins of young leaves are decorated with a narrow red line which disappears with age.

The flowers are more peculiar and interesting than pretty. They are borne on slender 50 cm peduncles arising from the axils of the leaves of the previous year's growth. Two or three pairs of these slender branches are produced, but flowers are borne only on the lower one, or, if there are three, occasionally on the lower two. They are in dense cymes that measure only about 5 to 7 cm across. The color varies somewhat from dingy white through flesh tones to light lavender. The size of the individual flower varies from 12 to 16 mm across. The degree of pubescence varies from none to dense.

The upper two of these branches, or sometimes, if there are six branches, the upper four are stolons, bearing at their tips young plants instead of flowers. The tips bend down as the young plants develop until they touch the ground; there the new plantlets root, and the stems rot away. Thus the plant does its best to insure its continuous existence.

The two natural methods of propagation, seeds and stolons, are about the only means available for this plant. Leaf cuttings apparently do not root.

Kalanchoe thyrsiflora Harvey is a striking and, on the whole, a unique species particularly in its thyrseoid inflorescence. The plant has been illustrated at least four different times: Woods and Evans (11), *Curtis' Botanical Magazine* (4), Marloth (8), and finally Pole-Evans (10).

As indicated by the above, this

species is a native of South Africa. One would suppose from the number of illustrations that it is a striking plant, and so it is; however, one could scarcely call it beautiful. Under normal conditions, the somewhat four-angled stem stands erect and reaches a height of about 60 cm. It is clothed with regularly and closely spaced leaves up to the base of the inflorescence. These leaves gradually diminish in size toward the top but never are distinctly bractlike. They are sessile, practically connate, broad oblong-spatulate, with entire margins not greatly different from the leaves of *Cotyledon orbiculata*; the color is light blue green, considerably softened by a thick white bloom. In full sun, the margins and outer halves of old leaves become red.

The inflorescence is a dense cylindrical panicle or thyrse composed of closely-spaced, many-flowered cymes. Each flower has a small fleshy calyx of almost separate segments and an inflated blue-green corolla tube about 14 mm long, and yellow ovate lobes about 7 mm long. The flowering season is usually late December or January.

It is not known definitely if the plant may be propagated by leaf cuttings, but certainly stem cuttings may be used. Seeds, of course, afford an easy means of increase.

Kalanchoe tomentosa Baker (see page 245), a native of Central Madagascar, deserves to be ranked among the best of the genus as an ornamental pot plant. Succulent plant dealers in California have been selling this plant under the name of *K. pilosa*, a name that belongs to an entirely different species.

K. tomentosa is one of the hairy species of the group which includes *K. beharensis*, but it bears no resemblance to the latter except in color.

The small, leafy plant seldom exceeds 1 m in height, including the in-



Kalanchoe synsepala

Claude Hope

florescence. The stem is moderately stout and rather freely branched. It is densely covered, as are all parts of the plant, with silvery-white, velvet-like hairs that are three branched shortly above the simple base. The leaves are alternate, a feature not possessed by any other species. They are oblanceolate, acutish and narrowed gradually to the sessile base. The margin is entire below the middle and above that point serrate. The serrations are marked with dark brown in lively and pleasing contrast to the silvery gray of

the rest of the plant. The flowers, borne on a long, branched peduncle, add little to the attractiveness of the plant.

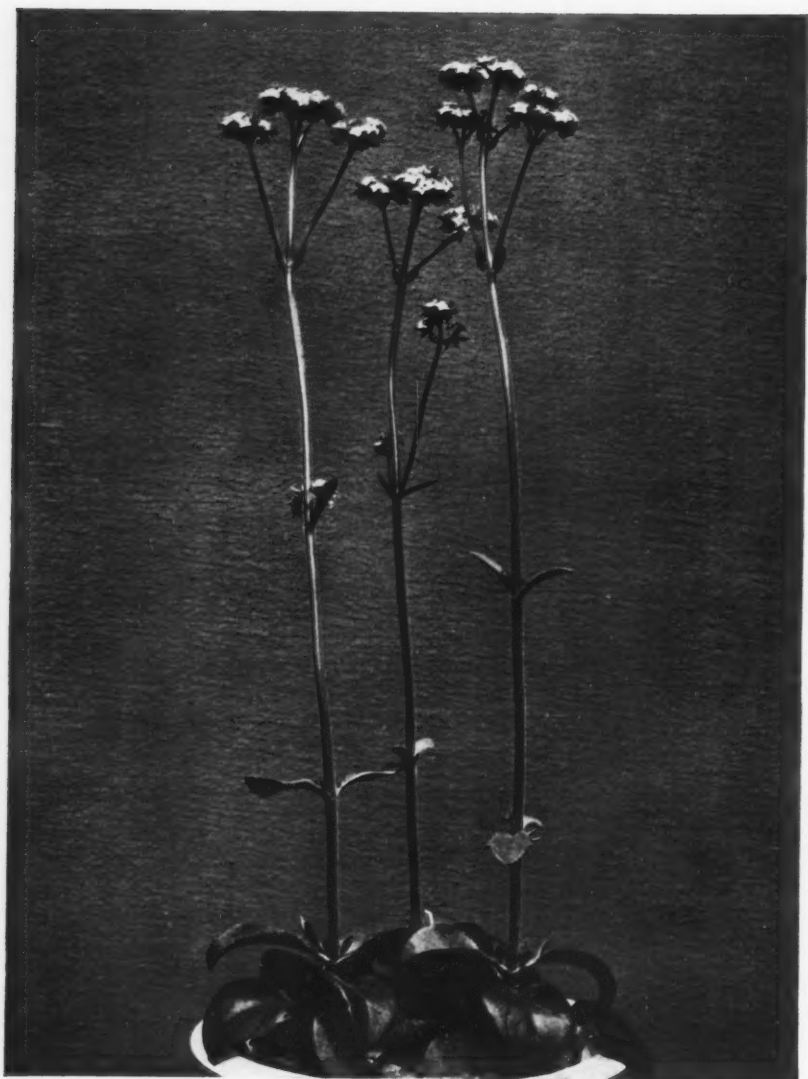
It is one of the easiest species to propagate. Like *K. orgyalis*, the leaves are brittle and tiny fragments root and produce new growths. Stem cuttings root readily; frequently aerial roots are produced. It is not dependable for flowers, hence seed is not readily obtained.

Kalanchoe velutina Welwitsch (see



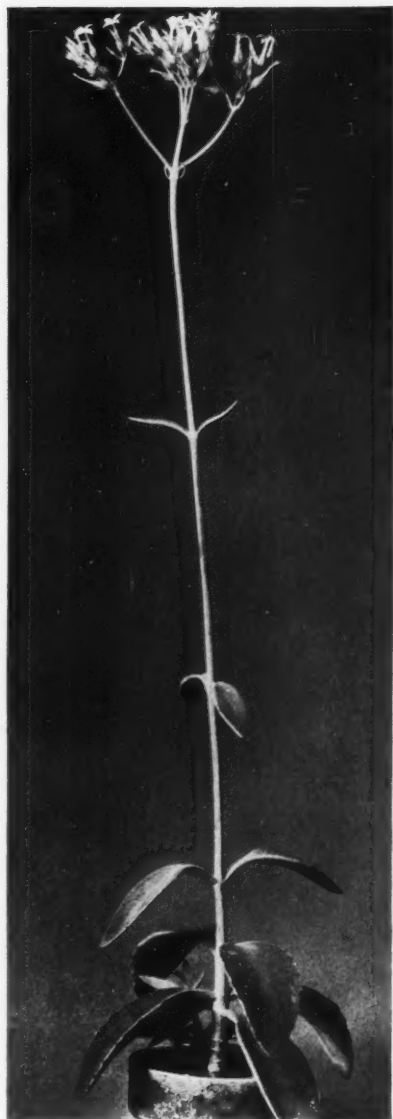
Lilian A. Guernsey

Kalanchoe tomentosa



Kalanchoe velutina

Claude Hope



Claude Hope

Kalanchoe welwitschii

page 246) seems to be rather widespread in tropical Africa. It has been described under several names, according to Hamet, and some of these, possibly, represent varieties. It is closely related to *K. crenata*, but it is a more valuable plant, especially in its flowers. Unfortunately, the illustration does not do it justice. It would be difficult to portray at best because most of its charm is in the color of the flowers.

In leaf and general plant habit, it does not greatly differ from *K. crenata*. Compared with the latter, the leaves are thicker, and only simply crenate, and are sparsely covered with simple white hairs. The inflorescence is of the same type of scorpioidlike racemes arranged in a panicle.

The flower characters are similar except for color and size. In that respect, *K. velutina* is more like *K. flammea*. The open flower is a good 2 cm across. The corolla segments are broad-ovate, overlapping each other a little at the base, and at the apex obtuse except for tiny abrupt mucron or tip. The color at first is rich yellow washed with crimson around the margins of the corolla lobes. As the flower ages, the amount of red increases. As a result, one finds in one inflorescence both orange-scarlet and rich red flowers. The inflorescence is reasonably compact for about the first three weeks. After that it begins to appear a little shabby. Sometimes, however, they keep in good shape for a week or two longer. It should enjoy a good demand as a cut flower novelty. The stems are long enough (up to 75 cm) for the most exacting. Few flowers have better keeping qualities.

It is easily propagated by seed, and leaf or stem cuttings. It is practically dormant during spring and early summer, and the flowers ordinarily appear in late December or January.

Kalanchoe welwitschii Britten, is another species included with *K. laciniata* by Hamet (6), but for the present it seems best to consider it separately. Although it is obviously close to *K. spathulata*, it is easily distinguished, and, on the whole, is a more ornamental plant. In a collection of kalanchoes, it adds variety by furnishing another foliage color.

The plant is entirely glabrous in all its parts. The leaves are glossy, and in plants exposed to the sun a beautiful purplish-bronze color partially masks the green. They are broad lanceolate, acutish, with short petioles, and with coarse, shallow, marginal serrations.

The flowers are rich, coppery yellow, but rather small, so they are not particularly striking. They are scarcely more than 12 mm across the expanded portion of the corolla.

In most other respects as an ornamental, *K. welwitschii* is similar to *K. spathulata*.

In addition to those mentioned here, at least one hybrid, *K. kewensis* Thiselton-Dyer (*K. flammea* × *K. teretifolia* Deflers), is available, but as the author has seen only vegetative specimens of this, it will be passed by.

This survey of kalanchoes covers only a fraction of the one hundred or more species of the genus, but it gives an indication of the variety of forms to be found here. Perhaps it is enough to stimulate the interest of those who are looking for something different to play with during the winter.

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Franklin's Tree

CHARLES F. JENKINS

Ten years ago the author prepared for the *Pennsylvania Magazine of History*, an article on the "Historical Background of Franklin's Tree." Since then, and within the last year, the old American Philosophical Society in Philadelphia has published the diary of John Bartram, the Philadelphia botanist who first discovered and introduced to the scientific and horticultural world, *Franklinia alatomahena*. This disclosed number of errors in the first article and also supplied some additional information, so that the article has been revised for *The National Horticultural Magazine*. The first error to be corrected was the spelling of the botanical name of the tree. William Bartram, son of John, named it *Franklinia alatomahena*, the latter the old spelling of the river on whose banks it was found. Modern geographers have dropped one of the numerous "a's" from the river's name and it is now the Altamaha, but according to rule the original botanical name must persist. The Altamaha rises in the highlands of northern central Georgia, being formed of the union of the Oconee and the Ocmulgee Rivers. It reaches the Atlantic Ocean through Altamaha Sound at Darien, Georgia.

Since the first of August the tree has been in constant bloom at the Hemlock Arboretum and like the venerable philosopher, whose growing namesake is it, *Franklinia alatomahena* will be giving of its beneficence as did he, with the same generous hand, up to the very

end which will be when the first killing frost comes. Few trees or shrubs equal it in the beauty of its blossoms. They float in the air like miniature pond-lilies, with snow-white petals and a great cluster of golden stamens, against the background of its magnolia-like leaves.

No tree which ornaments our gardens has a more romantic history. For one hundred and fifty years botanists have sought to find it growing in its native habitat by the Georgia river which is the descriptive part of its name. Nowhere along the banks of this muddy stream, or elsewhere in the state of Georgia, or in the northern hemisphere, or in the whole wide world have eager searches found it growing in its natural state. Every specimen of Franklin's tree now known in this country is descended from the seeds or seedlings of the little plants carried in 1777 from the banks of the Altamaha to those of the Schuylkill in Pennsylvania in an overloaded saddle bag. He is a rash person who would say it never will be found. Numerous expeditions have tried to run it down. Ten years ago an enthusiastic amateur horticulturist, Dr. C. C. Harrold, of Macon, Georgia, issued a placard with a colored illustration of the bloom and leaves, which he has scattered among boy scouts, farmers, hunters and woodsmen, hoping that, for a suitable reward, they may come across a living wild plant.

Its story starts with Peter Collinson of London, a wealthy Quaker mercer, who early developed an interest in nature and particularly in botany and gardening. His means enabled him to gratify his tastes and from 1712, until his death in 1768, he was one of that

group of cultured Englishmen who found the highest form of enjoyment in developing their gardens and estates. Addison and Pope and Horace Walpole lent their powerful aid to the new enthusiasm. Noblemen did not spare their means and gave as well their personal supervision to the development of their grounds. With many of them Collinson was in active correspondence and cooperation. He was elected a member of the Royal Horticultural Society, became the host, the friend and correspondent of Linnaeus, Kalm and other international botanists. His garden was first established at Peckham, on the Surrey side of the Thames, but in 1749 he removed to an estate inherited by his wife at Mill Hill, some ten miles northwest of London. It took two years to transplant his botanical treasures and some of them are still growing on the estate, now a boys' school. Still growing is a hemlock, *Tsuga canadensis*, sent by Dr. Christopher Witt, of Germantown, to Collinson prior to 1730.

Through his business connection with the Colonies, Collinson was able to secure seeds and plants with which he enriched his own garden and generously shared with other enthusiasts. Thus it was that in 1730 he was introduced to John Bartram, later to become the leading botanist of the Colonies, a man whom Linnaeus pronounced "the greatest natural botanist of his time."

Like Collinson, Bartram was a Quaker, his father coming to Darby, Pennsylvania, in 1682. The son early developed a love for botany and a copy of Parkinson's Herbal procured for him by a scholarly friend started him on his career as a naturalist. He built his home of native stone, it is said, with his own hands on the west bank of the Schuylkill River in Kingsessing township, a few miles above its junction with the Delaware and here established the first important botanical garden.

Bartram soon developed what became an extensive and remunerative trade through Collinson by shipping boxes containing 105 varieties of seeds which were sold to subscribers at the uniform price of five guineas a box. The scientists and collectors under the influence of Sir Hans Sloane, whose great collections were later to form the nucleus of the British Museum, were searching far and wide for anything which would enrich their cabinets and gardens. Noblemen vied with each other in the variety and extent of the plantings. Many of them subscribed for the Bartram boxes annually.

To procure these seeds, plants and natural history specimens Bartram traveled, usually alone, from Nova Scotia to Florida and from the sea to the Great Lakes. In the backwoods between the Blue Mountains and the Alleghenies he found his chief hunting ground and here could be heard the tinkle of the little bell tied on his horse's neck, as absorbed in his search he turned the animal loose to graze. By 1765, Bartram's fame as a botanist was secure and through the efforts of Collinson he was appointed Royal Botanist to George III.

Two years before, Spain had ceded East Florida to England in exchange for Havana and Collinson decided that the new royal botanist should attract the attention of the King by exploring the newly acquired peninsula in quest of novelties. Accordingly Bartram, with his son William, set out from Savannah and on September 20, 1765, reached the Altamaha River, then the southern frontier of Georgia. They had missed their way and came to the river four miles below Fort Barrington, which had been built where the road crosses the river to the then wild Indian country beyond. Here they lodged for the night and the next day proceeded to the fort. "This day we found several curious shrubs" Bartram notes

in his journal with a provoking vagueness to those who have searched in vain for the original habitat of *Franklinia*. William Bartram, the son, writing two decades later, records "At this place (Fort Barrington) there are two or three acres of ground where it grows plentifully." But the travelers were in a hurry to reach an important Indian Council in Florida where Bartram was to assist, so they neither identified nor

procured specimens of it. But this was undoubtedly the first contact of qualified botanists with the Franklin tree.

The first name on the list of members of the ancient and now very much alive American Philosophical Society in Philadelphia is that of Benjamin Franklin, the second is that of John Bartram. They were lifelong friends and fellow workers in the realm of the natural sciences. Franklin in his letters



Franklinia alatamaha at "Far Country"

addressed him as "My dear old Friend," while Bartram addressed Franklin as "My dear beloved Friend" and after the death of Peter Collinson Bartram writes, "I have no friend as intimate or capable as my dear Benjamin," and he continues, "although I have been deprived of thy agreeable conversation for several years I have thy pretty exact picture hanging by my bed which gives a daily fresh remembrance of intimate friendship to thy sincere friend John Bartram." When Bartram's eyesight began to fail Franklin, who was in London, sent over thirteen pairs of lenses so that he might select the pair best suited to his eyes, instructing him to keep those which were successively stronger to use as they might be needed and those of lesser power than he required were to be given to others who might need them.

Collinson's latter years were shadowed by financial shrinkages and the theft at night on more than one occasion of a great portion of his garden treasures. His mantle as agent and correspondent of the Bartrams, fitting not quite so snugly, fell on the shoulders of another Quaker scientist, Dr. John Fothergill, likewise a friend of Franklin's, of the American Colonies and of humanity in general. Dr. Fothergill, like Collinson, had been a friend and correspondent of Linnaeus. It was "our Collinson" he writes Linnaeus, "who taught me to love flowers and he who shared his comradeship could do no other than cultivate plants."

Young William Bartram, now desirous of collecting on his own account, arranged with Dr. Fothergill to finance a botanical journey into Georgia and East and West Florida. Arriving in Carolina early in the Spring of 1773 he took boat for Savannah. Fortunately he found the Provincial Assembly of Georgia in session and met several country members at his boarding place

whose advice and introductions were later to smooth his way.

Botanical and political history were both in the making as the young botanist, in high spirits, took the road for the South, astride a good horse which had cost him £40, consuming a large part of his first year's compensation. Soon he turned off the high road to the left to visit Sunbury, then a bustling town, considering itself the rival of Savannah in the volume of its shipping, but today its deserted, sandy site is one of the "lost" towns of Georgia.

Bartram had been welcomed everywhere with open arms and true southern hospitality and urged to tarry as long as he would. "Having been greatly refreshed by continuing a few days with a kind and agreeable family I prepared to resume my journey southerly," he records. It was the next day, that, taking the road up the northeast side of the Altamaha to Fort Barrington, after riding fifteen miles he again came upon the grove of small trees which he and his father had first discovered in 1765. "On drawing near the fort I was greatly delighted by the appearance of two beautiful shrubs in all their blooming graces." "Blooming" in this case must have been a general term for *Franklinia* does not bloom until the autumn.

Just when Bartram secured the cuttings, plants or seeds of *Franklinia* which he sent to his patron, Dr. Fothergill, is not clear from his rambling and rather obscure account of his travels, but it would seem that it was on the return from his visit to East Florida. It was in 1774 that Dr. Fothergill, through William Malcolm, a nurseryman, presented a plant to the Royal Gardens at Kew and it first became known to the English scientists. I am inclined to the opinion that the *Franklinia* presented to the Kew Gardens by Dr. Fothergill was not procured by Williams who was also collecting for

Dr. Fothergill. The latter writes William Bartram, September 4, 1773, as follows: "There is a young man from England engaged in the service of a company at Charleston. He travels into the Cherokee country and though unacquainted with botany has sent me many rare seeds and some plants picked up with much judgment which are now recovering from their voyage. It may not be improper at some time to go with him as he will be able to point out things which he had not been able to collect." "William Malcolm, a nurseryman of Kennington, introduced *Gordonia pubescens* to Kew in 1774, the year of its introduction into England," writes Arthur H. Hill, Director of Kew Gardens, July 28, 1932.

For five years Bartram wandered through the wilderness of the country of the Cherokees, the Creeks, the Chictaws, the Chickasaws and the Seminoles. He gazed over the waters of the Gulf of Mexico and noted the mighty flood of the Mississippi. Towards the north he penetrated what is now Tennessee. He would return to the coast at intervals, shipping his boxes and bales of seeds, plants and natural history specimens to Dr. Fothergill, now from Sunbury, now from Charleston and again from Mobile. For long periods his family had no word from him and several times concluded he was dead. Meanwhile the muskets had rattled at Lexington and Bunker Hill; Trenton, Saratoga and Brandywine had passed into history. Independence had been declared. Apparently unmindful, or at least not noting these momentous events which greatly increased the restlessness and danger from the Indian tribes, Bartram pursued his leisurely way, wearing out horse after horse but ever on the alert for some new plant or specimen for his patron. The Seminoles called him "Puc Puggy"—the flower hunter. He seemed everywhere to have been re-

garded as a gentle, harmless wanderer to whom it was a pleasure to bring specimens that would help him.

During the spring and summer of 1777, he revisited several districts in East Florida and Georgia and it was then, no doubt, he obtained for his own use the seeds, cuttings or seedlings of the tree that had so intrigued both father and son on their first visit twelve years before. In the late autumn he rode northward, reaching home in January, 1778, to find his venerable father had died and Philadelphia occupied by the British General Howe and his troops. It is said John Bartram's death had been hastened by fear for the safety of his garden on the approach of the British army.

The treasured plants or seeds which Bartram brought home were planted in the Garden and in five years these young trees were producing seeds. Just when Franklin was informed of the honor conferred, by naming the rare tree for him, we do not know, nor whether Franklin in any way acknowledged the honor done him. Many honors had come to him but none that will be more enduring than this one, nor one which in its interest and rarity would be more honorable.

Some twenty miles from Kingsessing, Humphrey Marshall, a first cousin to John Bartram, had established a botanical garden in Chester County, remnants of which still remain. He too was a botanist of note and a correspondent of Dr. Fothergill's. In 1790, his son Dr. Moses Marshall, set out on a botanizing tour extending as far as Georgia. He was interested in hunting up the plantation of *Franklinias* and found them growing as his cousin had described, near Fort Barrington, but from that day to this, one hundred and fifty-three years, no one has seen it growing in the wild.

It is the rule with botanists that the

first publication of a name in some recognized botanical work gives such a name priority and permanently attaches it to the plant. It was in cousin Humphrey Marshall's *Arbustrum Americanum* published in 1785, that the first description of *Franklinia Alatomaha* was given and the name scientifically applied. The European botanists, however, had previously decided it belonged to the family of the *Gordonias* and early labelled it *Gordonia pubescens*. It has been known by this name for a century and a quarter, but twenty years ago, or more, Dr. Frederick V. Coville, of the Department of Agriculture at Washington, decided that *Franklinia* is the correct name. The seeds of the latter are so different from those of the *Gordonia* that he and other botanists regard it as a distinct genus.

The original Franklin tree, or possibly a successor, was growing in Bartram's Gardens when more than a half century ago they were abandoned and greatly neglected. Wandering cows broke in and horned the tree so seriously that it was all but dead but, rescued by a neighboring gardener, it was removed to his nearby home and nursed back to health. Later it came into the possession of the Meehans, the well known nature lovers and nurserymen of Germantown. When it had been recovered, the nurserymen proceeded to propagate plants by the layering process. For many years this was the only successful method of propagation. Neither seeds nor cuttings could be made to grow although the Bartrams had produced young plants which were listed in their earliest catalogue of plants for sale. In layering, a branch was bent to the ground with a stone placed upon it; in three years it had taken root sufficiently and was cut off from the parent limb. It was allowed to grow where it stood for two years more and was then ready for transplanting. This was how the tree at

the Hemlock Arboretum was grown and it was a red-letter day when the friend who cared for it for the five years telephoned it was ready for transplanting. It will be realized how slow the process and how difficult to obtain young plants so that to own a *Franklinia* tree during the Victorian era was to mark one as a horticultural aristocrat. The number of *Gordonias* living at that time, mainly in the gardens around Philadelphia, was not more than a score and it is safe to say that every *Franklinia* growing today in the United States traces back to these garden aristocrats which in turn were descended from the Bartram tree which was so nearly finished by the aggressive cows.

Thirty years ago Dr. Alexander Coville discovered what was wrong — that both the seeds and cuttings could be propagated successfully only in an acid soil. With this fact established a few appreciative nurserymen are now raising young plants in quantities and the Franklin tree will soon be a common denizen of our gardens.

Many expeditions have searched for the Franklin tree in its original habitat, beginning with the expedition made in 1882, by H. W. Ravenel, a South Carolina botanist, at the instance of Professor Charles S. Sargent of the Arnold Arboretum. Other parties have combed the muddy swamps which border the Altamaha in the region of old Fort Barrington to their own great discomfort and the annoyance of the rattlers and other venomous snakes which infest the region. Professor Edgar T. Wherry, now of the University of Pennsylvania, has made three unsuccessful expeditions. Fire may have destroyed the original plantation, it may have been grubbed out by the early settlers, or the salt tides may have backed up the river, or again freshets may have washed it away. Several times in recent years the daily press has carried



Franklin's Tree 'Far Country'

a news item that the *Franklinia* had been found but these have all been erroneous, other plants have been mistaken for it.

Two botanists from Philadelphia, Dr. Francis Harper and Arthur N. Leeds of the Academy of Natural Sciences, visited the Altamaha, near Fort Barrington, on April 5, 1933, searching unsuccessfully for the Franklin tree in its wild state. They did discover on or near the site the other plant *Pinckneya*, which William Bartram found growing in close association with *Franklinia*.

The Franklin tree is hardy in the north as far as Boston, growing to a height of about twenty-five feet, branching low, the limbs smooth and beautifully marked. In the autumn its leaves turn a glorious crimson but fall at the first heavy frost. Its smooth, striped trunk makes it easily identified, its snow-white blossoms are its glory and

its long-continued florescence its distinction. All in all it is a worthy monument and memorial of the "First Civilized American" whom Philadelphia claims as its own.

Bartram's Garden, long in decay, has now been taken over as a city park under the interested cooperative care of the John Bartram Association which has restored and is now protecting and developing the house and grounds. In the garden are again growing many descendants of the original Franklin tree, but one of quick manufacture, symbolizing the electric age which Franklin himself started and the efficiency and hurry of the present day. I have recently seen an acre patch filled with growing, sturdy, young *Franklinias* and it bids fair to become an every day remembrance of the distinguished circle of Franklin and his botanical friends.

(October 1943)



Lewisia howelli

J. Horace McFarland Co.

Lewisia

FLORENS DE BEVOISE

If you have never had the pleasure of raising any members of the *Lewisia* family you have a rare treat in store for you.

Lewisias hail from our Great Northwest. They are found among the mountains near the Pacific Coast and the Rockies, both British and American. They were named for Captain Meri-

wether Lewis, of the Lewis and Clark Expedition.

It is curious that these beautiful plants are so seldom seen in our eastern gardens. One rarely sees them even in rock gardens boasting of varied collections of European alpenes, which need more care and often give less reward in the way of beauty than many of our own mountain dwellers.

The majority of the *Lewisias* are true alpenes and with one or two exceptions have not only great beauty, but a long season of bloom as well. They are perfectly hardy in our climate and their requirements are few. Good drainage is of course a necessity, and the soil should consist of ordinary garden loam containing a little well-rotted manure; to this should be added

some sand, leafmold and stone chips. I find that, as with most of my alpinas, they enjoy a little peat mixed with the stone chips around their roots. English books will tell you that these plants thrive best in full sun, but I have found that sun should be given with discretion, in other words a sunny situation with shade during the afternoon, or at least part of the day. I was glad to find that Mrs. McCully in her book *American Alpines in the Garden* holds the same view that experience has taught me. To quote from this excellent book—"Probably those species from the Rockies and also the great plateau stretching from them to the Cascades and Sierras, can withstand the burning sun of the greater portion of our American climate. However, those that face toward the Pacific in the north know only what must seem a diluted sun to those farther east. While in a climate similar to their own these too will re-

joice in full sun, this will need a little tempering through much of the United States. I have not seen this point stressed, but I believe it responsible for some of the trouble experienced in the first tryouts on the Atlantic coast."

About four times during the year my plants receive a top dressing of stone chips, or grit, with a little humus added. When planting, allow about six inches between the tips of the rosettes in order to have good specimen plants and to get the full effect of their radiating blooms. This does not hold true with *Lewisia rediviva*, which should be rather closely massed to give the best effect. They should not be watered very often, as if kept too moist they may rot. Those in gardens near the shore need rather less water than those in a drier atmosphere. In England, glass is used to protect these plants from winter wet. However, a few of mine shifted for themselves last winter

Lewisia columbiana rosea

J. Horace McFarland Co.



and came through very well with no covering; others, under a covering of salt hay, did equally well. If their beds are sufficiently raised and the drainage good, a covering of salt hay should afford enough protection.

Unless they are in bloom the plants may be set out from spring until fall. The seed is rather slow to ripen and shakes off easily, so it is best to cut the stem when the pods are well dried and place in a warm dry place to finish off, in order to avoid losing the seed. When ripe, the seed should be planted at once in pans containing a light soil mixed with humus and sand. These should not be allowed to dry out and will germinate the following spring.

Lewisia howelli comes from the mountains of Oregon. It forms a rather flat rosette with oblong to ovate leaves having a thin crinkled margin. The flowers are a soft buff shade with a deep rose marking through the center of each petal. There are nine petals and I have counted thirty-seven blooms on one little plant, radiating from the center in all directions on stems from four to seven inches long, a lovely sight. This variety also makes a fine house plant in the winter; it makes no objection to an over-heated, dry atmosphere, and those I brought in last winter kept in bloom for a little more than two months. The pot should be dipped into water about three times a week.

L. redeviva should be planted in groups and rather more closely together; also it needs more water during the blooming season. The soil for this should contain more peat and less sand and grit than other varieties. It also requires more sun. The leaves are densely clustered, smooth and glaucous. The flowers are rather like a water lily and vary in color from white to rose. It loses its leaves when the blooms arrive and after blooming disappears until the following spring.

This species was used by the North American Indians as a food. "The specific name, *redeviva*, was given by Pursh in consequence of the root, long preserved in the herbarium, and apparently dead, having been planted,

revived in a garden in Philadelphia." As a matter of fact this root was immersed in boiling water, and prepared for the herbarium, and a year and a half later, as it still showed signs of life, it was planted and produced its beautiful blooms.

L. columbiana is found in the mountains of Oregon and British Columbia. There are two varieties. One has pink and white striped flowers and the other, which is a more recent find, has rosy-lavender blooms. The type has dark green tightly-clustered rosettes and a very long period of bloom. These are easy to grow and, for me, have done well in full sun and in quite a shady spot.

L. cotyledon closely resembles *Saxifraga cotyledon*, though lacking the encrusted edge and being of a stronger shade of green than the *Saxifraga*. The flowers resemble *L. finchii*, though it is perhaps not so profuse a bloomer; however, to make up for this it increases very rapidly. The offshoots may be removed and planted in pans, where they soon become husky young plants.

L. finchii has a flat rosette, the leaves are broad and strap-shaped, and the flowers a soft pink with white margin. This species is a very profuse bloomer and one of the easiest to grow.

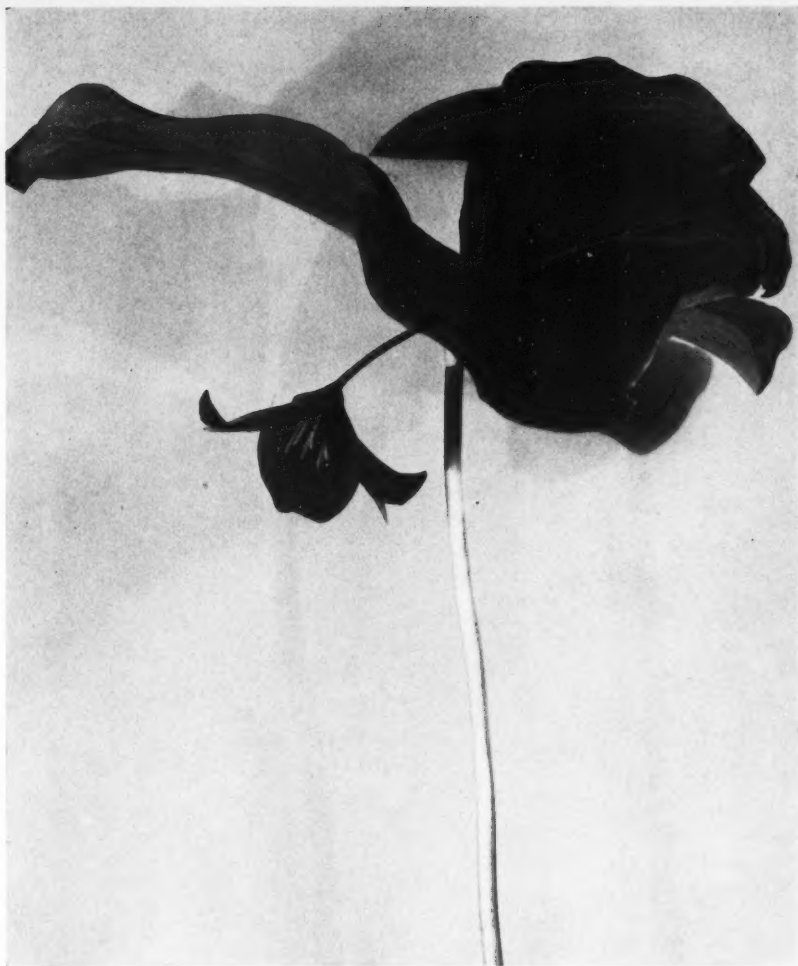
L. oppositifolia is a deciduous species from the mountains of California and Oregon. It needs half shade. Its dainty pale pink flowers are most attractive and it blooms from June until autumn.

L. leana is also found in Oregon and California. The leaves of its rosettes resemble pine needles and the flowers vary from red to white.

There are several other species which I have not tried as yet, and it would seem that many more may yet be discovered to add grace and charm to our gardens.

Since writing this article I find that one plant of *L. howellii* from which I cut three stems bearing thirty-two flowers the last part of May, has come into bloom again and looks very gay with thirty-six blooms to its credit.

(October 1931)



E. L. Fisher

Trillium vaseyi

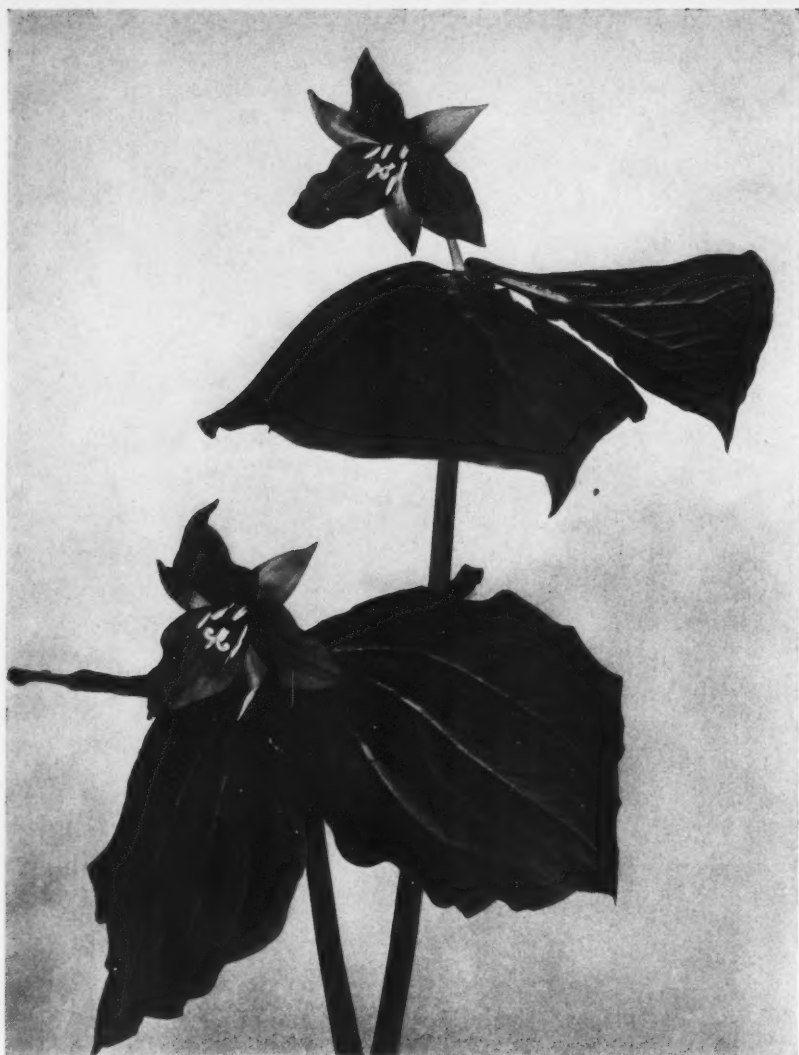
Trilliums

ANNIE LEE R. CLEMENT

"Fools rush in where angels fear to tread" is no doubt true in this case, since botanists, scientists and many amateurs realize how badly the Trillium family is mixed and how much

it needs further study, but I am only giving a few of my observations and not posing as an authority.

I have grown twelve species of our southern Trilliums at Nik-Nar for a number of years and collected all of them except *T. sessile* which was sent me from Virginia. I have recently added two more species to my garden, *T. pusillum* and *T. underwoodii*, but since I have not checked them in my garden I will omit them, even though I have seen them elsewhere.



Trillium erectum

George Massa

Trilliums are easily grown and make very satisfactory plants for woodland gardens. They should be used more frequently. Their requirements seem to be shade and leafmold. I grow them in an acid soil, under a variety of deciduous trees, which is very dry at times. The deeper the humus the better trilliums one will have. They like moist but well drained soil, but not wet. I find *Trillium luteum* in

alkaline soil but it grows equally well in acid conditions. If trilliums are to be used in beds, it's well to plant some ground cover with them such as ferns, *Sedum ternatum*, hepaticas, etc., as the *Trillium* foliage dies down before summer is over and this practice prevents bare spots.

Our first blooms appear in March or early April. *Trillium hugeri* opens the season with stout stems carrying



George Massa

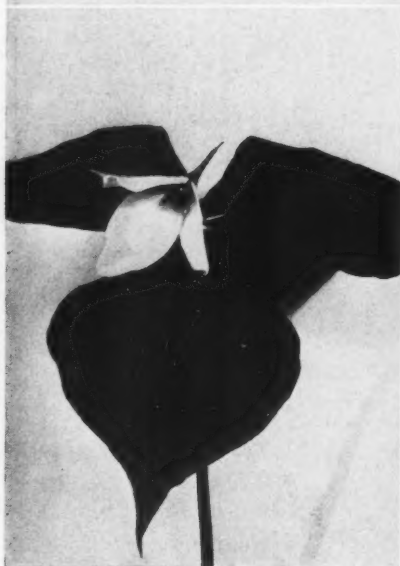
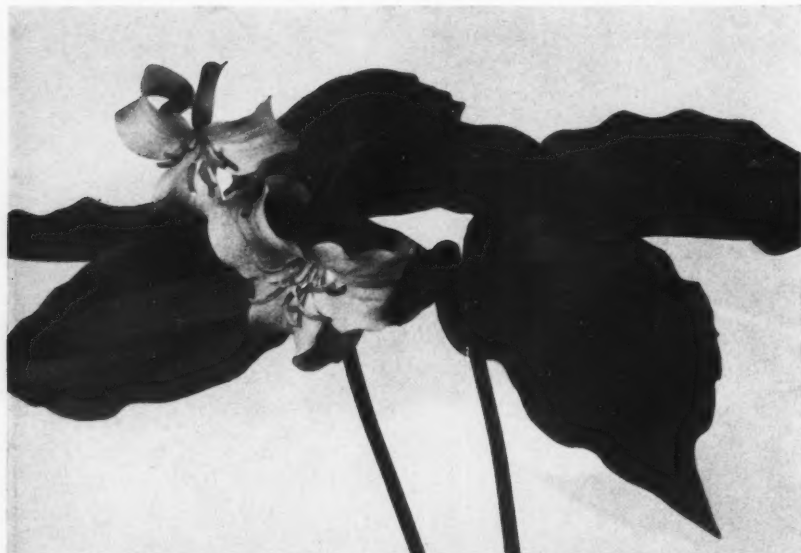
Trillium undulatum

handsome marbled foliage of a purplish color blended with two shades of green. The flowers are sessile and of a dark maroon color, smelling profusely of crushed fruits. They grow six to eighteen inches high.

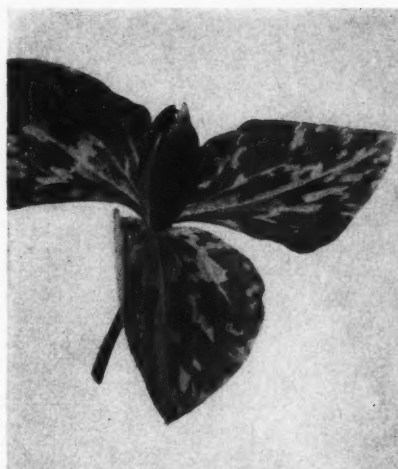
Following closely will be *T. simile* with its large white petals surrounding a dark ovary, which varies in color from brown to black. The anthers are

large and cream colored but the dark ovary is the point of interest. The flowers are held well above the large rhombic foliage. No odor is found in these showy flowers.

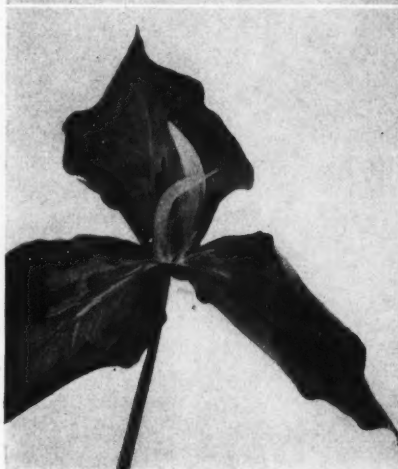
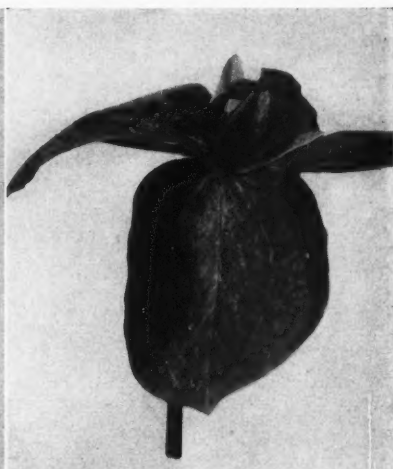
Before these are gone the majority of species are in flower. *T. erectum* has stately stems and long pedicels carrying maroon flowers with dark ovaries and cream stamens. There are

E. L. Fisher*E. L. Fisher**George Massa**Trillium catesbaei**Trillium simile**Trillium undulatum*

Trillium hugeri



Trillium sessile



Trillium luteum

Trillium discolor

All photographs by E. L. Fisher



George Mossa

Trillium cernuum

many discolors among this species varying from greenish purple to pure white. This *Trillium* seems to "cluster" more than the others, sometimes eight flowers coming from one rhizome.

Trillium luteum has been classed as a discolor of *T. hugeri*, but I feel that Prof. Harbison was right and it is another species. There is a marked difference, even to a layman, when they are seen together. *T. luteum* is at least two weeks earlier; the odor is different, *T. luteum* having a decided lemon fragrance; the marbling of the foliage is in two tones of green; the arrangement of the pollen is unlike and many more minor differences. Then, too, I have never seen a discolor in *luteum* but there are discolors in *hugeri*, even to golden yellows. One disappointing feature of *T. luteum* is that when grown in the north it is a sickly green. Here in the south it is a clear lemon yellow.

The snow *Trillium*, *T. grandiflorum*, has the widest range of any of the species, extending from Quebec to Florida. The large blossoms of pure white are very beautiful surrounding a cluster of cream stamens. It never opens out flat but stays tubular in shape. When it ages it fades to pink or even rose. Some claim a pink form, but all darken with age.

While *T. sessile* has chocolate-colored flowers, and as the name implies has sessile flowers, they are quite different from *T. hugeri*. The flowers are much smaller with broad rounded petals. The foliage is almost a plain green and the odor is not pleasing.

T. cernuum, the nodding *Trillium*, is white with recurved petals and dark anthers. The flowers hang just beneath the leaves and are not so easily seen as others.

The Painted Lady, *T. undulatum*, is the most difficult to grow in my garden. They come from our high mountains and I feel that they require more mois-

ture than I am able to give them. Perhaps this is the most beautiful *trillium* and surely the most easily identified. No other has the red lines at the base of the petals and it is the only one that has petioled leaves. The fruits are a bright red.

T. album is found on our high mountains also and it is best described as a white form of *T. erectum*.

The latest *Trilliums* to bloom are *discolor*, *catesbaei* and *vaseyi*. *T. discolor* is very dwarf but effective with its marbled green foliage. The cream-colored petals are rounded at the apex and when fully opened stand apart, showing the dark stamens near the ovary. This *Trillium* is very rare but seeds freely and is easily propagated.

The "Pink *Trillium*" of the Carolina Mountains, *T. catesbaei* (*stylosum*), is a dainty little plant. It is of the nodding type, has bright pink flowers and crisped recurved petals and cream anthers. It fades a deep rose color. The foliage is usually bronze and at times appears red.

The largest of our *Trilliums* is *T. vaseyi*. The slightly recurved maroon petals are a good background for the tan-colored anthers. I have found this *trillium* in deep moist woods more than two feet high and with blossoms more than four inches across. The most interesting one I ever saw was no doubt a hybrid. It was checkered, maroon and white, like a piece of gingham.

There are many freaks among *Trilliums* as well as other flowers. One is fortunate to find a double form as well as ones with four, six or other unusual number of petals. To me *Trilliums*, even as nature intended them, are among the most fascinating of our native plants. They are dependable, can be transplanted at any time; will not only live but usually bloom the following year, even though the flowers have been removed.

(October 1938)



Calochortus amabilis

The series of portraits that follows, photographed by Lilian A. Guernsey, was taken from flowers grown in the East and shows the varied types of flowers in the genus.

Notes on Calochortus

B. Y. MORRISON

These charming bulbs from the western states are not as much used in gardens as they should be. There are, to be sure, various reasons why they may not be as useful in the general border as many other plants and even more reasons why they will not fit into the general scheme of the garden that must always be a bower of bloom, but in most gardens there are some places that can be devoted to plants that like a hot situation, with reasonable amounts of moisture during the spring months and a well drained, warm soil for the remainder of the season. It should be said at once that winter cold seems to have very little to do with the life of the plant. The time of difficulty is the

autumn season when abundant rains and mild temperatures will start the dormant bulbs into active top growth that is not hardy. In a general way it is the same problem that confronts the gardener who grows Spanish iris or the more difficult *oncocyclus* iris.

In the present experiment, now going into its third year, a site was chosen where there would be a maximum of sunlight, perfect natural drainage and a not too rich soil. The border lies under a hedge of evergreen barberry that sends its greedy roots into the bed. The exposure is to the south and no shade, not even from distant trees, falls across the border. The soil was dug out to a depth of eighteen inches. In the bottom of the trench a good layer of stones was laid, much as in the preparation of a rock garden. The remainder of the trench was filled with the natural soil, none too rich, to which had been added equal parts of leaf soil and fine gravel. At the time of planting the bulbs, a little more coarse gravelly sand was added to the planting holes.

The bulbs resemble small, rather elongate tulip bulbs, with coarse coats that split to show the orange-colored inner skins. One plants them in the usual manner, down at least twice the depth of the bulbs themselves. Like tulips, also, they can be planted very late in the season, which helps one the first year as the planting can be delayed until the ground is cold.

The earliest warm weather in spring brings up the first leaves, that look for the most part like the single leaves that small tulips send up. These are

followed later by the developing stalks that usually carry rather finer grassier leaves. It is these first leaves that bear the brunt of winter injury in the established plants for they will push up in late fall, despite all one's efforts not to let the border get wet. Even if frosted, their loss is not fatal to the health of the plants.

As to the plants themselves, one finds that they fall into three sharply marked groups which are well indicated in the illustrations and a fourth group which is not so conspicuous and is not illustrated.

It is a member of this fourth group that usually comes first into flower and is one of the most permanent of all the species, as well as one of the least showy. It is *C. lilacinus*, one of the meadow tulips. In spite of its secondary charms, one welcomes its pale lilac shell-like flowers that come into flower with the crocus.

It is soon overtaken, however, by the fairy lanterns, first the low yellow *amabilis*, then the somewhat taller pink *amoenus*, and finally the taller *albus* and the wire-faced yellow *pulchellus*. Although woodland plants in their native homes, these plants are dependent on a dry site for their summer rest and do not seem to suffer here in company with the plants of drier climates. The pictures show their characteristics and suggest the peculiar charms of their nodding flowers. They cannot show, however, the transparent tissue of the petals nor indicate the pearl-like tinting of the petals. If one could choose but one of these, I believe that the white form would be the one to select as it makes the tallest plant and bears the most flowers on its branching stems.

Before the fairy lanterns are all swinging, the first of the next sections have appeared, and mid-April makes quite a show in their borders. The star tulips, or owl's ears, as they are

known in the west, are lower plants that tend to tangle about on the ground, with weak and twisted stems that just hold up their flowers. The pictures show the form (see pages 266, 270-272) and suggest the reason for the common name, the inner surfaces of the petals being lined with silky hairs, like uncut velvet. *Marveanus major* is essentially a lavender tinted white, *marveanus roseus*, a brilliant clear pink, and *benthami*, a brilliant lemon yellow, with rusty spots at the base of the petals.

A word should be said about the colors of all these flowers. In every case they are of the most glowing brightness, intense clear yellows, vivid pinks, pure lavenders, unbelievable scarlets, in many cases set off by accents of color in the green of the pistil, the green blues or pale lemon of stamens and the astonishing markings in the Mariposa tulips, the last group to flower.

The first of this last section to appear is one that has not been happy here, although it has persisted. *Catalinae* from southern California (page 278) is a slender thing, with almost pure white flowers in the bulbs I have had, set off by the deep crimson, almost black spots at the very base of the petals. Before it has entirely gone, the first flowers of *luteus citrinus* (page 277) and *howellii* (page 276) are open. The latter, from Oregon, is not altogether happy, either, but usually gives more flowers of clear enamel-like substance, ivory white in color, with hints of green at the base of the petals, a yellow gland spot and dark brownish hairs. The former ushers in the great display of the Mariposas. As yellow and shining as any buttercup or trol-lius, it makes a great display with three inch flowers, marked and pencilled in deep red browns and covered with brown tipped hairs at the base of the petals.

It is soon joined by the forms of *venustus*, of which those illustrated (pages 280, 281) are the extremes from the variety Eldorado, the one with a white ground, the other with a rosy-lavender ground, all of the forms with deep rosy-purple blotches on each petal and variously colored pencillings and dotting over the lower part of the petals, under the abundant coats of silky hairs that also are dotted and tipped with color. Words entirely fail to indicate the beauty of these flowers on the two-foot slender stems, nodding and delicately poised. The variety *purpurascens*, as it has flowered here, is almost exactly like these forms, except that there is in each case a second smaller blotch above each large blotch and a more or less distinct band of color connecting the two and fading out toward the margin of the petals.

While they are in full flower, there come the amazing flowers of *kennedyi* from the edges of the desert in southern California. Fragile plants with slender stems and thin leaves, topped here with solitary flowers of such brilliant orange red and *Lilium tenuifolium* seems almost a shadow. The dark purple, almost black spot is small and close to the base. In some happier climate, these plants should show better growth and more flowers, but I am happy enough to have cheated them into living at all. Among my plants was also a pure lemon-yellow form.

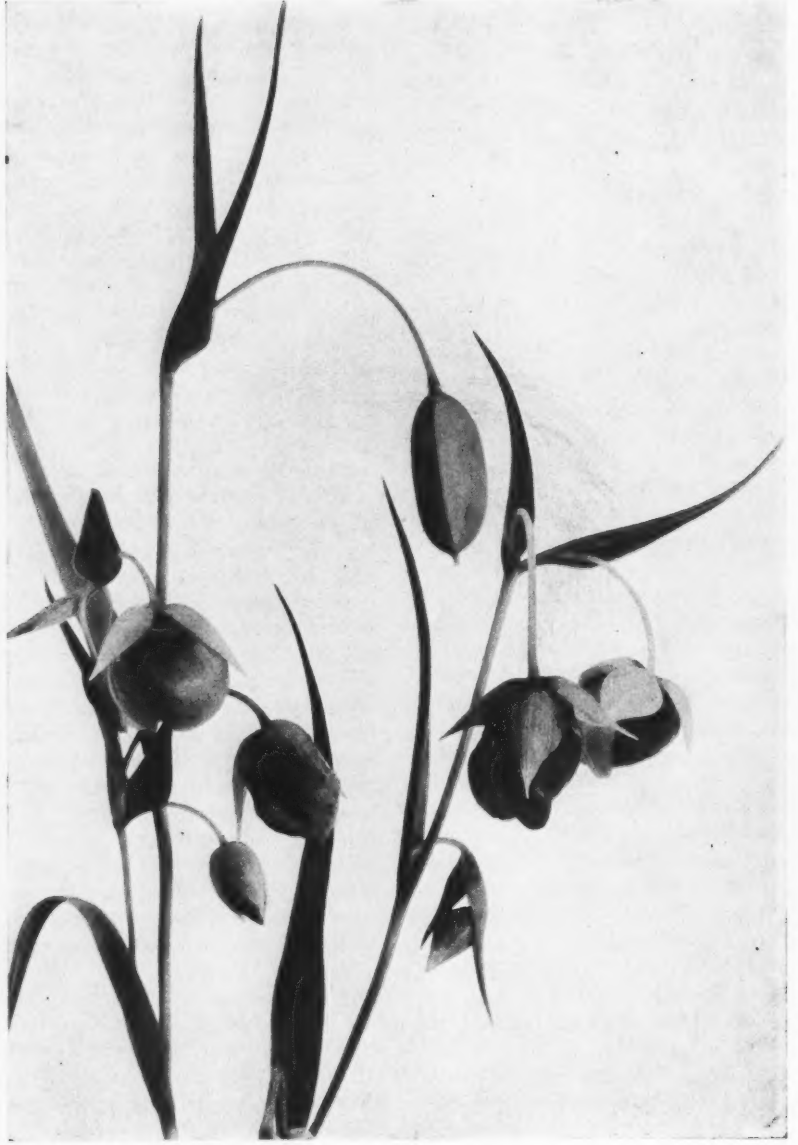
After this there is a brief lull in the procession before *luteus* (page 279) shows its rather short-petalled pale lemon-yellow flowers on two foot stems. As compared to the variety *citrinus*, which, to my gardener's eye, should be a variety of *venustus* rather than of this species, this makes a smaller display but the flowers are lovely enough with their thin pencillings of deep sienna brown.

Greenei appeared next, here on rather short stalks but with large flowers, with rather truncate petals of clear pinkish lavender with amazing hairs like delicate floss, not only over the petals, but along the edges.

Even more showy is *nitidus* (page 282) with tall branching stems, and shell-like petals of clear lilac, covered like the last with long tender hairs over the petals. None of the flowers here were blotched with the indigo blotch of the books, but were handsome enough with the deep purple blotch, the greenery-yallery freckling and the speckled hairs deep in the cup. At the same time come the huge flowers of *gunnisonii* (page 283), of tinted white color, running down to green in the base with a yellow blotch and a tangle of dark spotted hairs.

Before these have finished, in the last weeks of June, come the final species, *plummerae* and *macrocarpus*, both tall and branching plants with many flowers. Neither do as well as I have seen them in California and neither make as great a show as do the varieties of *venustus* as their branching growth spreads the flowers far apart. The flowers of the first have been all pale, somewhat pinkish lavenders with clear yellow hairs that line the whole of the inside of the petals, almost to the upper edges. The flowers of the second have been a somewhat deeper bluer lavender, with some darker hairs and yellowish blotch within and a greenish band down the outside of the petals.

It is a matter of regret that we do not have photographs at the present time of the last two species as they are well worth the attention of gardeners here, particularly as they rarely make any autumn growth of foliage, are slow to put in their appearance in the spring and so escape the late frosts that are the nightmare of gardeners.



Calcochortus amoenus



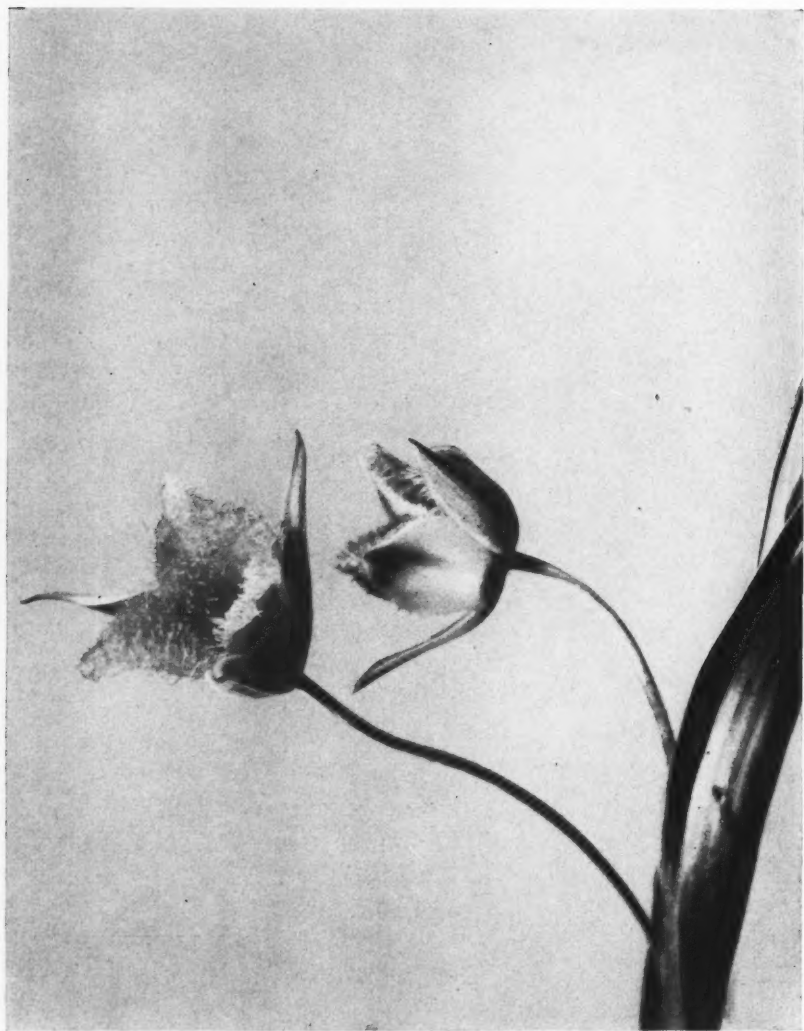
Calochortus albus
($\frac{1}{2}$ natural size)



Calochortus pulchellus



Calochortus maweanus major
($\frac{1}{2}$ natural size)



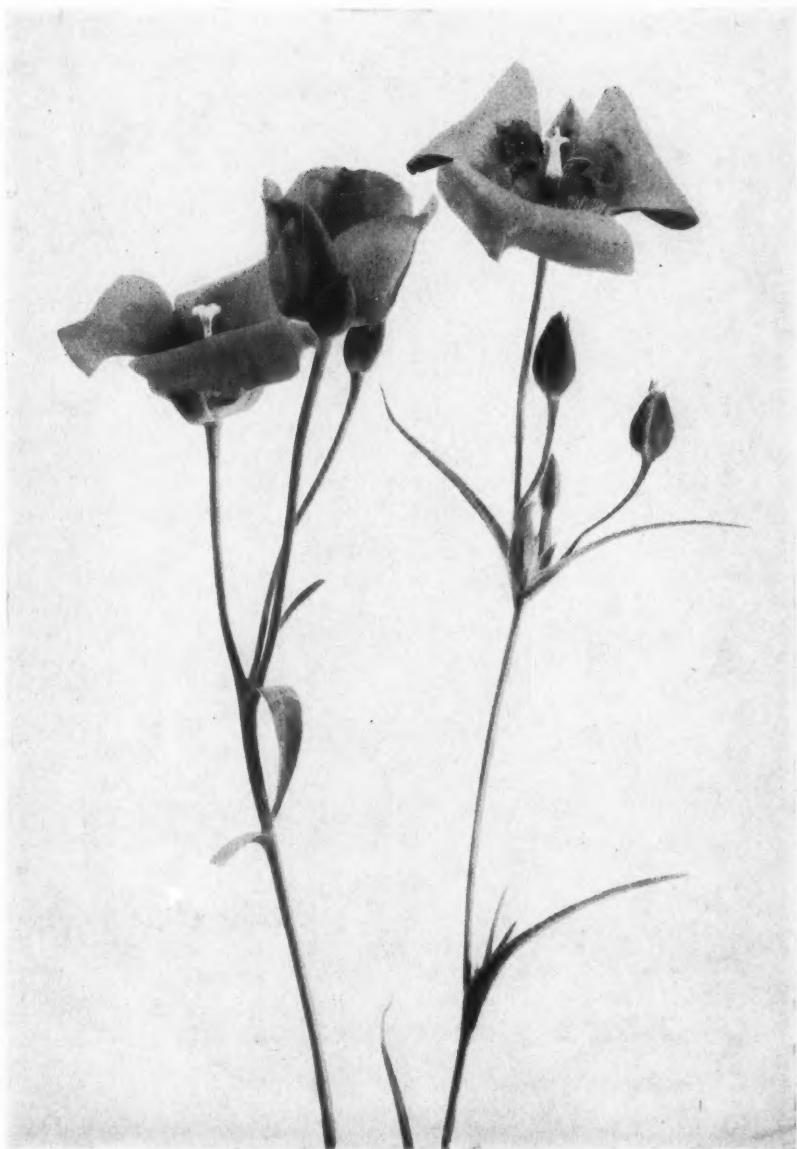
Calochortus maweanus roseus



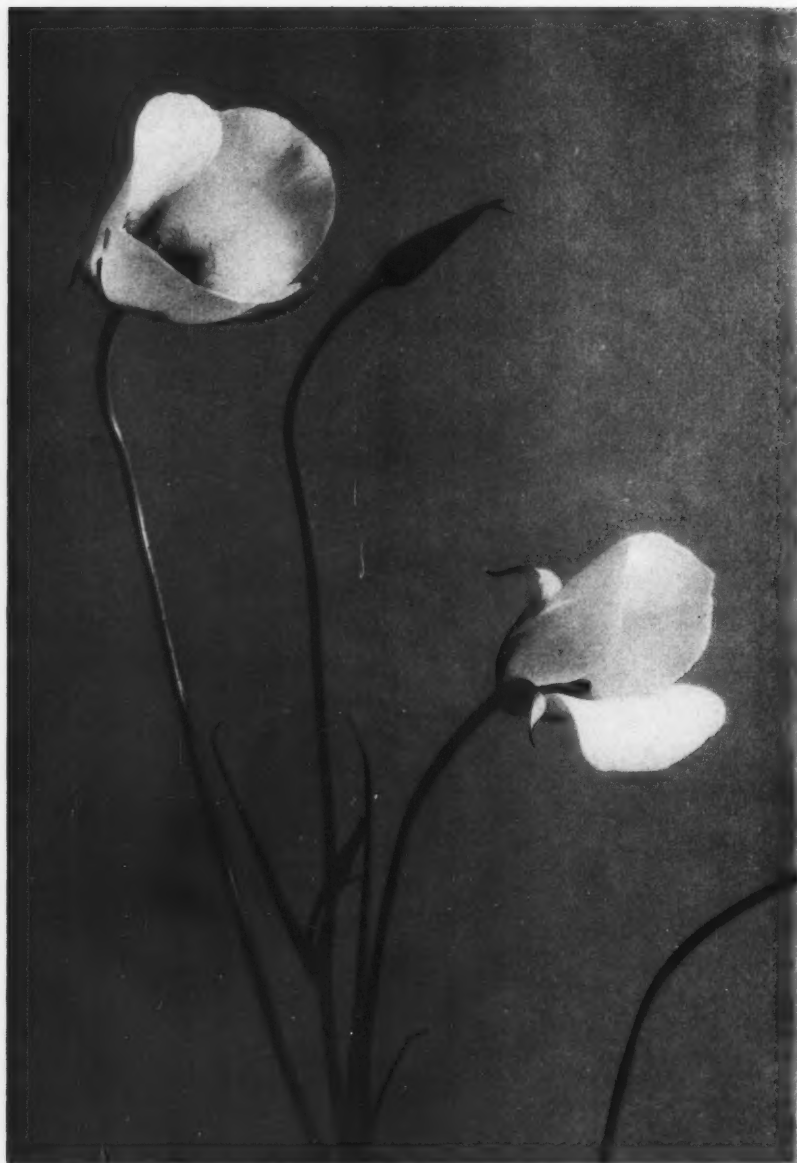
Calochortus benthami



Calochortus howellii



Calochortus luteus citrinus
($\frac{1}{2}$ natural size)



Calochortus catalinae

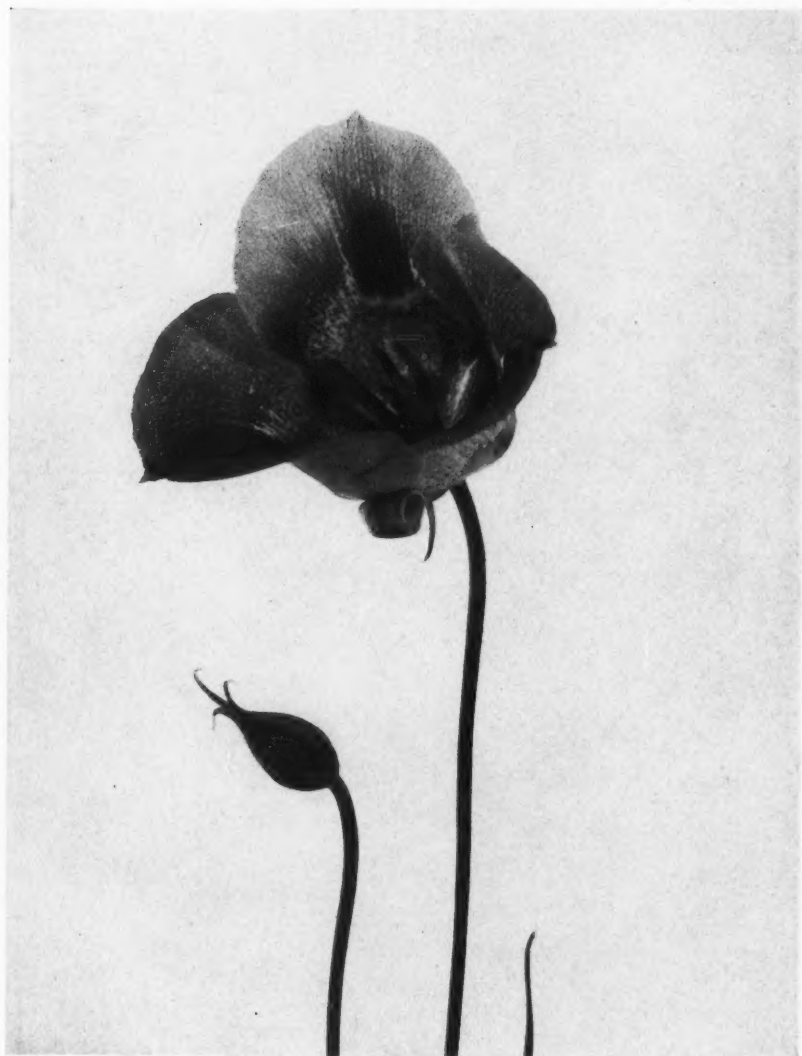
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Calochortus luteus
($\frac{1}{2}$ natural size)



White form of Calochortus venustus
Eldorado Strain



Rosy lilac form of Calochortus venustus
Eldorado Strain



Calochortus nitidus
($\frac{2}{3}$ natural size)



Calochortus gunnisonii

(July 1932)

[283]

Erythroniums

CARL PURDY

A flower that is either charming in some way or decidedly unpleasant in some way is almost sure to have a popular name. Wherever *Erythroniums* are among the wild flowers, the women and children love them and consequently name them. In Europe there was but one species and that is everywhere there called Dog's-Tooth Violet. Its Latin name, too, is merely the same thing or rather just *Dens-Canis* or Dog's Tooth. A more inappropriate name could hardly have been given it, if we judge by first impression, but the flowers are violet in color and the bulbs are the shape of a dog's incisor tooth—not so bad after all.

Rather widely scattered throughout the eastern half of North America are several species and here they are called either Adder's-Tongue, Dog's Tooth Violet, or Trout Lilies. The Adder's Tongue would seem to be named from the shape of the leaf; the Trout Lily from the spotted leaf.

On Mount Ranier, *Erythronium montanum* grows in such numbers as to give a white color to the landscape and there it is the Avalanche Lily, while *E. grandiflorum*, which is less plentiful, is the Yellow Avalanche Lily.

Move on down the coast to Astoria and we have Star Lilies; not so bad, for the half-open flower is certainly a six-pointed star. In Oregon generally they are Fawn Lilies from the spotting of the leaves, although in a few places Adder's Tongue is used and was probably brought from the East by early settlers. In northwestern California they are usually Easter Lilies, owing to the fact that they are in flower at Easter and are used in decoration. Lake County in that region makes an exception for there they are Chemise Lilies. Chemise, I may remark, is a shrub which covers wide expanses of hilly country and gives the erythronium the light shade that it loves. When I was a boy here they were Adam and Eve. Often they have two flowers, the upper larger, hence the name.

If I were writing a treatise on the value of scientific names for flowers, I could hardly give a better example of the confusion to which popular names lead us. The word *Erythronium* means just the one thing all over the world while these popular names mean nothing away from the immediate neighborhood where used. In Mariposa County *Erythroniums* are Mariposa Lilies and the *Calochortus* are Mariposa Tulips and correctly.

While *Erythroniums* are not true lilies they are among the genera most closely allied to true lilies. They are native of woodlands in rather mild to cool climates or on mountains well up

in the cool regions. In order to give a general idea of the genus I will treat the one European species and the few eastern American species very briefly. I have no personal knowledge of them so will rely upon Bailey's Cyclopedia for my data.

But first as to some botanical terms used in the description of Erythroniums. If this article were written solely for popular use I might sufficiently designate the species by color, locality or some other salient points, but as some may like to be able to understand the botanical characters, I will briefly treat them in that way also.

The flowers of all lilies are divided into six parts and the outer parts are not just like the three inner parts. In flowers generally these parts are called petals and sepals but in lilies they are called the segments of the perianth; for convenience I will use the word petals for all of them. In very many

Erythroniums down close to the bottom of the inside of the inner petals there are little knobs which are called auricles (ears). Very many bulbs propagate by little bulbs produced either on the side of the parent bulb or at the end of short stems from the parent bulb. Some Erythroniums propagate one of these ways, some the other, and some by neither, but only from seeds.

In botany a key is a very convenient expedient for finding the name of a plant. If, for instance, I should tell you that a man had a wart behind his ear you could not miss him far. If I added that he was cross-eyed, the identification would be almost perfect, and if I added that he was 30 years old, there would not be one chance in ten million that you would get the wrong man. Botanical keys are built in just that way. The things seized upon to identify a plant may seem small, yet they are characteristic.

Once established in a congenial environment Erythroniums self sow and perpetuate themselves for years.

E. L. Crandall



KEY TO ERYTHRONIUMS

Group 1. European.

Erythronium dens-canis, the original Dog's-Tooth Violet. Mottled leaves; single violet-colored flower.

Group 2. American. East of the Rocky Mountains. All one-flowered.

E. americanum has leaves mottled with brown and a single yellow flower. The three inner petals have auricles at the base. It grows in rich soil in moist woodlands and has many offsets on slender underground stems. Widely scattered east of the Mississippi.

E. albidum. Has no auricles and the leaves are not mottled. Flowers pinkish white. Ontario to New York and Minnesota to Texas.

E. mesachoreum. Has neither offsets nor mottling on the leaves; flowers lavender with broadly spreading petals. Iowa, Kansas, and Missouri.

E. propullans. Has offsets near the middle of the underground stem. The leaves are green with a little mottling and the flowers are rose-colored with a yellow base. South Ontario to Minnesota.

Group 3. Western America, from the Rocky Mountains to the Pacific.

General remarks: Earlier botanists put stress on the size of the flowers. For instance the first-named species was *E. grandiflorum* or Great-Flowered Erythronium. Another was named *E. giganteum* or Giant Erythronium, while still later botanists have named one *E. parviflorum* or Small-Flowered Erythronium. As a matter of fact there is but one western American erythronium which could be spoken of as different in size of flower, and that is *E. purpurascens*, which is really small-flowered. In all other species, size is a matter of soil, climate, or other conditions and any species may be smaller or larger in accordance with

those conditions. The same is generally true as to the number of flowers. In the forms of *E. revolutum*, four flowers to a stem may be the largest number found, but in other species they may far exceed that number, with eighteen as the largest number that I have ever seen. Whenever fire burns over the beds the flowers are larger and more numerous.

SUB-GROUP 1.

Leaves not mottled. Petals auricled.

E. grandiflorum. Leaves a light green; style 3-cleft at the top. Flowers bright yellow in the type. This species has a very wide distribution. If you began high in the Rocky Mountains in Colorado and followed them into Canada; if you went high in all of the ranges of the Cascades; if you traversed the plateaus between these mountains and went down the slopes on both sides of the canyon of the Columbia River, you would find *E. grandiflorum* at intervals. If then you went along the Cascades, you would still find it at high elevations to some distance south of the Oregon and California border, but always in high mountains.

There are several forms. Some botanists have named the eastern form *E. parviflorum*, yet it is not small-flowered and has no distinctive difference. It is true that in some regions it has red anthers but even in the same region many flowers will have yellow anthers.

Variety *album* is found in the plateau regions of northern Idaho and eastern Washington and is, of course, white-flowered with a slight greenish tint. This was first described as *E. grandiflorum albiflorum*.

I have named a variety *robustum* from the low elevations on the Columbia River because it seems to be much easier to grow here.

E. tuolumnensis has very large leaves of a deep green; large conical bulbs which offset like a tulip with the offsets

inside the covering of the mother bulb. The flowers are a deep rich yellow. When the leaves and stems are dry they cling so strongly to the bulb that it takes an effort to detach them. This species, one of the most distinct of all erythroniums, was discovered by Professor Applegate of Stanford University, in 1930, and is limited to a very small area in Tuolumne County in the Sierra Nevada region of California at about 3,000 feet elevation.

E. purpurascens has narrow undulate leaves of a dark green color with metallic tints. The flowers are never large and are a light yellow or almost white, tinted purple. It grows at from 5,000 to 7,000 feet in the Sierra Nevada Mountains, a region of heavy snowfalls and late springs.

E. montanum is the Avalanche Lily of the State of Washington. Its leaves are broad and its flowers are pure white with orange base. Its home is high on the peaks of Washington and Oregon, in full open sun and it grows in such profusion there as to color the landscape. It is a very lovely species but my experience is that it is utterly intractable in cultivation. Instead of starting growth with moisture in the spring as all others do, it lies dormant until its usual growing season, which is July or August, when it meets utterly hopeless growing conditions.

SUB-GROUP 2.

Leaves mottled.

Section 1. Species inhabiting well-drained lands in cool places. No off-sets. Propagation only by seeds.

E. californicum. Leaves richly mottled with brown; style 3-cleft; auricles on inner petals. In the type the color is a light yellow, deepening gradually to rich yellow at the center. A very fine species growing in the coast ranges of California, beginning fifty miles north of San Francisco and extending about two hundred miles to the north.

Variety Bicolor, discovered by myself in 1930, has flowers with the outer

half pure white, the inner half almost orange and a very pronounced and delightful fragrance. Found in southernmost part of the range of the species. A very lovely form and possibly will prove to be finest of all in cultivation.

Variety "White Beauty," found at the northern extreme of the range of the species in Humboldt County, California. The color is really a slightly creamy white, which by comparison is white. At the inner base there is a zone of maroon to almost red in many flowers. In the wild it only grows in very rocky places and even in the fissures of rocks. At one point I saw fine flowering bulbs in the fissures of an almost perpendicular cliff. It takes to ordinary soils wonderfully well and Van Tubergen, one of the best European authorities, considers it the best garden Erythronium.

E. hendersonii has an undivided style, richly mottled leaves, and a flower which is lavender in its upper two-thirds and deep brown-maroon at the center. In its color perhaps the most distinct of all erythroniums and one of the most charming. Found on either side of the Oregon-Californian border for perhaps fifty miles and well back from the ocean.

E. citrinum has an undivided style, richly mottled leaves and a flower which is pure white on outer half and citron at center. The stem is much stiffer than related species. For perhaps fifty miles on Oregon-California line, beginning thirty miles from the ocean.

E. howellii alone has no auricles on petals but is otherwise close to *E. citrinum*. The flower opens white on outer portion and citron at the center and within a day or so begins to turn pinkish until it is decidedly pink. Habitat same as last three species.

Section 2. With offset borne on slender thread-like underground stems.

E. hartwegii and *E. purdyi* comprise this group. They are alike too in the peculiar way in which the flowers are



Erythronium revolutum — 'Pink Beauty'

L. A. Guernsey

borne. All other *Erythroniums* have the flowers, if more than one, in a raceme but in these two the flowers are borne in a sessile umbel so that each appears to be on a separate stem like a bunch of flowers in a bouquet holder. In *E. hartwegii* the flower is light yellow, deepening to bright orange at the center; in *E. purdyi* it is white with a very pale lemon center. All other *Erythroniums* have bulbs which speedily suffer if exposed to the air and would lose all vitality in a week or so,

but the bulbs of these two are thickly coated and would keep months if fully exposed, and, in fact, have about the keeping qualities of the tulip. In their native homes they live in a decidedly hot portion of the foothill region of the Sierra Nevada Mountains of California where there are no dense shades. The soil is open and never wet and in summer gets to be very dry. The eastern rock garden has no section even in full sun as hot as these bulbs live in habitually. They force well in

pots if handled as Dutch forcing bulbs are. Both can be planted successfully in much hotter and drier regions and locations than any other.

SUB-GROUP 3. THE REVOLUTUM GROUP.

Leaves mottled; petals auricled, with broad auricles which join to make a sort of ring at base of petals. Stamens with the filaments broad at base and coming to a point. In all others the stamens are slender throughout. The name *revolutum* implies that the petals turn back more closely than in any other species, but that is not true. They at first open broadly with little curve but eventually curve well back. The type has a flower of much firmness and has stout stems.

The forms of *E. revolutum* have quite different habitats from any other western species. They are found in decidedly moist soils and prefer a rich loam. In the rainy season the soil is often quite moist to wet. I have seen beds over which a little stream flowed for months in the early season and often have dug them when ripe in soil which was so wet as to be sticky. Later it gets drier, although always at least barely moist. In my garden I had a bed of *E. johnsonii* one year planted in a soil which was moist but not wet. Excessive rains made it almost a quagmire all winter, yet they were happy.

E. revolutum type is exceedingly well marked in general appearance but changes in color from region to region. At the south it begins in Mendocino County, California, about 80 miles north of San Francisco and about 12 miles from the ocean. This is a region of heavy winter rains and many summer fogs. At that point the color is white tinted lavender to light lavender. The species follows at about the same distance from the ocean going north, and in Humboldt County, 140 miles north, is all soft lavender-pink. This is "Pink Beauty." On north it extends, always not far from the sea coast, and

in another hundred miles in a deep pink form and with leaves having dark mottlings. Other forms have light mottling. This is a new form for the gardens which will go out as Rose Beauty.

Another hundred miles and in north-western Oregon, it is a real rose with white center and this is *E. johnsonii* or *E. revolutum johnsonii*. Another move up the coast and it is found in a similar rose-colored form but with orange center. I have not had specimens from farther north excepting from central British Columbia, where it has the same form as at its beginning in California. Given right conditions, *E. revolutum* stands above all other species.

E. revolutum watsonii is also known as *E. giganteum*. The name *E. giganteum* was first employed for a form of *E. grandiflorum* so can not be used. I really believe that it should be considered a separate species. It has the mottled leaves, the stout stem, the large auricles and the broad based filaments of the type, yet is not nearly so stout a plant, nor so erect. There are many forms of it. Only two of them have been named either horticulturally or botanically. The color varies from pure white banded maroon at the base to rich cream color with or without zones of maroon. At its best some of the forms are the most lovely of all Erythroniums. Purdy's White is a named form with pure white and maroon zone. *E. revolutum praecox* is rich cream with a zone of brown and is a most lovely flower. From a botanical standpoint it would not be worth while to name others of the forms, yet from a garden standpoint several of them are desirable enough to merit garden names. The species begins about fifty miles north of the Oregon-California border and extends north in the moist interior, west of the Cascades section, far into British Columbia. This then covers the species known in the West, with the exception of one that Professor Applegate found in the Siskiyou Mountains but has not yet published.



Erythronium revolutum

L. A. Guernsey

HARDINESS OF ERYTHRONIUMS

Of course the East American species are hardy for they grow wild almost all over the region from Nebraska east and into Canada. The western species have been planted very widely in gardens throughout the East from Montreal south and there is not a particle of doubt as to their hardiness.

CULTURE OF ERYTHRONIUMS

First some words as to handling of bulbs. With the exception of *E. hartwegii* and *E. purdyi*, the bulbs will dry out enough to decrease vitality when out of the ground in a short time unless packed in barely moist packing material and kept in a cool, shaded place. They are not bulbs which can be kept in a store in open bins, nor are they bulbs which can be shipped in dry material or in any other than a painstaking way. When the one who is to plant them gets them, they simply must be speedily planted or else kept in barely moist material in a cool place. Still again they must not be planted in dry soil. This caution is as a rule unnecessary east of the Rockies, for in September and on, when the bulbs would reach the planter, the soil is almost sure to be at least moist. In the West the caution is strictly wise. I have lost many bulbs by planting in dry ground or by planting in moist ground which, during a long fall drought, lost its moisture. But on the Pacific Coast when the soil is dry it is dry. Three or four months' exposure to a hot sun leaves very little moisture in the surface soil.

Erythroniums can be grown well in a great variety of soils. Drainage is

necessary and shade too. Not a dense shade but about the degree of shade that an apple tree gives. They will grow and make great leaves in dense shade but the flowering will get less and less under those circumstances. I have seen fine plants in gravel, in sticky clay, in sandy loam, and in soil three-fourths broken rocks, so that I would say that they are very adaptable to soil so long as there is a moderate amount of humus and a shady position. If I were making a soil especially for them, it would be a light loam mixed with one-fourth grit and quite a little leaf mold.

The bulbs are long and slender and the top is smaller. They must be planted upright. A careful measurement in my garden shows that the bulb seems to do best when planted to a depth of from four to five inches, which means a cover of $2\frac{1}{2}$ to $3\frac{1}{2}$ inches. The caution as to not planting in dry soil does not apply after the planting time. When they are established they retain vitality perfectly in soil in which they would suffer at first. The bulbs can be obtained after September 1st and should be planted before December 1st. With good care they are in fair condition until New Year, yet the tendency is to suffer after mid-November.

If the gardener observes these simple rules, he will find Erythroniums most easy to grow, easy to maintain, and that a bed will continue in beauty for years. Under right conditions they self sow and it takes at least four years for the seedlings to reach the flowering stage. If seeds are sown, they may come up in spring or they may lie dormant until the spring of the succeeding year. In my experience they do the latter more often.

Cover Illustration

The Society wishes to express its sincere appreciation to Artist Erick Hans Krause for his original conception of *Franklinia alatamaha* appearing on the cover of this issue. The original gouache casein from which these plates were made measured 22 by 26 inches with the *Franklinia* flower centered in its natural habitat. The Society regrets that it was impossible to reproduce the entire painting because of lack of space for its proper reduction.

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